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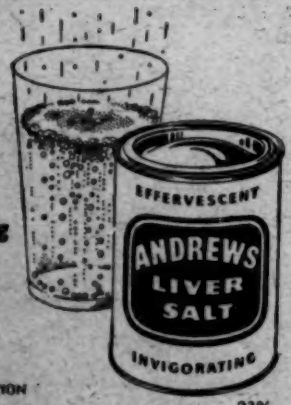

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY DECEMBER 25 1954

HOW MEDICINE BECAME ANATOMICAL*

BY

CHARLES SINGER, D.M., D.Litt., D.Sc., F.R.C.P.

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For the last 400 years every medical man has been trained to regard an accurate knowledge of the structure of the human body as the very foundation of his art. This attitude is now so general that we treat it as self-evident. Nevertheless the idea was at one time revolutionary, and its modern acceptance is due to certain reformers of the sixteenth century, and especially to Vesalius. But even since his time, as also in many earlier centuries, there have been highly scientific observers of disease whose work has been quite independent of anatomy. Such were the Hippocratic physicians of the fifth and fourth centuries B.C., several of the Arabic writers, and notably Rhazes (A.D. 852–932) who first described measles, the founders of modern epidemiology, Baillou (1538–1613) and Sydenham (1624–89), and the great schools of medical statisticians of the nineteenth and twentieth centuries. In our own times whole regions of medical thought, such as those of demography and psychological medicine, are developing without any clear anatomical background.

Most teachers would probably now agree that the medical curriculum is overweighted on the purely anatomical side and that the time for lightening the load has arrived. Nevertheless there is no likelihood that anatomy will lose its place as the basic, positive discipline of our art. The processes which have determined the modern status of anatomy make a very long and exceedingly complex story, extending over some two and a half millennia, touching and combining with various cultural streams at many points. Here it will not be possible to do more than glance at a few of the more important incidents in this long story.

Folk Attitude to Necropsy

All know of the popular resistance to post-mortem examination and of the general fear and disgust aroused by a dead body. What is the origin of all this? "Religion," some would answer. Surely no. The objection is more ancient than anything that can reasonably be called religion. That word, if it is to have any meaning at all, must be related to some coherent view of man's place in the universe. The very beasts, who can have no anticipation of death, no understanding of its nature, and certainly no religion, flee from the dead body of a comrade. Among human beings there are still many tribes who are quite unaware that death is the inevitable end of life and regard every such event as something unnatural, brought about by the attack of malign beings. Many peoples of lowly culture, still in the hunting, food-gathering, or early agricultural stages, habitually abandon a hut or even a village where a death has occurred. They prefer rebuilding to living within reach of unfriendly spirits.

The belief that the dead exercise an evil influence on the living, and must therefore be propitiated, is as universal as the belief in ghosts. This attitude is found in all those cultural stages that precede the differentiation of religion, in the proper sense, and long survives its development. Such a view, whether held consciously, or half-consciously, or unconsciously as a folk-memory, naturally opposes investigation of the structure of the human body. Post-mortem examination and, still more, dissection are disrespectful to the dead. This is wholly irrational and can be made to fit no rational conception of life from either a spiritual or a materialist point of view. But which of us has not met it in seeking to obtain permission for a necropsy?

A Great Contribution to Science

The scientific investigation of the human body is not very ancient. It was introduced at a fairly definite date and under distinctive philosophical influences. Dissection was not practised by any people before the Greeks. It is one of their great scientific contributions. When, where, and under what circumstances did it arise? The first two of these questions can be answered with considerable exactness. Dissection of the human body was first practised systematically in public about 300 B.C., or possibly a few years earlier, and it began effectively at Alexandria. What is more debatable is the intellectual atmosphere that made this change of attitude possible among the Alexandrian Greeks.

The pre-Alexandrian Greek attitude towards a direct investigation of the structure of the human body can be gleaned from the earliest documents of the so-called *Hippocratic Collection*. This is a large mass of writings of various dates. It must be understood that there is no real evidence that any one of these texts is by Hippocrates, though several are of his period—that is, of somewhere between 450 and 350 B.C. It is these earlier members of the "Collection" which alone interest us here. They discuss clinical conditions on a sound observational basis but exhibit only the simplest theories of disease. They show no tendency to elaborate such conceptions or to locate disease in special organs. They regard disturbance of health as due to the behaviour of certain fluids or humours of which the body is composed. Diseases result from excess, defect, obstruction, or perversion of one or more of these four humours. Since

*Being the substance of the Lloyd Roberts Lecture delivered at the Medical Society of London on September 30, 1954.

diseases are not discussed with reference to local origin, they are not treated as related to the structure of the body. Why, therefore, should the "Hippocratic" physician study anatomy? He did not.

But throughout the *Hippocratic Collection* diseases are sharply distinguished from lesions, such as fractures and dislocations, which are unmistakably related to bodily structures. This differentiation is itself an advance, for in earlier cultural stages diseases were regarded as themselves injuries inflicted by malign beings. The reader may be reminded that the German word for lumbago is, to this day, *Hexenschuss*, "witch-shot." We ourselves still speak of an "attack" of a disease, of a "seizure," or of being "struck down" by some condition. We still recognize a clinical entity

FIG. 1.—Post-mortem scene from a MS. of about 1300 in the Bodleian. The figure with hand raised is a physician. Behind him stands a monk. The operation is performed by an assistant.

called "the plague," which word is nothing but the Latin *plaga*, a blow. None of these terms is very far from the "witch-shot" of the Anglo-Saxon leeches.

It is in connexion with the investigation of fractures and dislocations by the "Hippocratic" physicians that we meet the first traces of real anatomical knowledge. This, in the *Hippocratic Collection*, is seen especially in certain accounts of injuries to the shoulder, hip, and jaw, of about 400 B.C. or perhaps a little later. In the treatment of these injuries, the "Hippocratic" physicians were manifestly more competent than the Egyptian physicians, to whom, alone among their predecessors and contemporaries, we are able to compare them. They were more competent because they possessed some real anatomical knowledge, yet it was still not obtained by any systematic anatomical investigation.

The Greeks of the fifth and fourth centuries B.C., "the Hippocratic age," had a fear of the dead, like all ancient peoples. Moreover, they attached great importance to the proper burial of bodies, even those of enemies. Without decent burial the early Greeks thought that the dead would not only find no rest but would give none to the living. Yet, despite all this, there is some evidence that a small amount of superficial dissection had occasionally been performed by some daring Greek physicians. An examination of passages in the "Hippocratic" works on fractures and joints, especially those on the shoulder-joint, suggest that the author at some time had seen these parts laid bare. He had certainly a fairly detailed knowledge of the bones involved and a clear conception of the mechanics of the joint.

Fear of Dead Bodies

How could this be? How could a Greek of the fourth century B.C. ever examine the structure of a dead body, even to this small extent? There is evidence of a change of attitude to the dead body among the Greeks of that time in the *Dialogues* of Plato (427–347 B.C.). A good example is in the *Phaedo*, which was written somewhat before 367 B.C. In it Socrates (died 399 B.C.), after having discussed the immortality of souls, and having been asked by Crito how he wished to be buried, is represented as replying:

"'In any way you please, but take care that I do not get away from you.' And then he turned to us and, laughing gently, added, 'I cannot persuade friend Crito that I will be the same Socrates who is now conversing. He thinks I am another Socrates whom he will soon see as a dead body, and he asks, forsooth, "How shall he bury *me*?" And this, though I have been saying at great length that when I have drunk the poison I shall leave you, and go to the joys of the blessed. Yet he seems to think this mere talk, uttered to comfort you. Therefore I want you to be surety for him, as at the trial he was for me, that when I die I shall but go away, so that Crito may not be grieved when he sees my body ill-used. I would not have him troubled by thinking my lot an evil one or say at the funeral that he is burying Socrates.'" (Abbreviated.)

Here is an attempt to overcome the fear of dead bodies on the basis of a rational hypothesis. This is the conception of the soul as an essential but separable element of life. It is not our purpose to discuss here the evolution of the doctrine of the soul, but it is clear enough that we are here presented with a view which, if accepted, would bring such fears into contempt among rational men and relegate them to the class of mere superstitions. And it is noteworthy that among the scores of items in the *Hippocratic Collection*, though they are separated from each other by several centuries, though they are written with varying degrees of dignity, though they exhibit different attitudes to observation, though they have diverse moral outlooks, and though they belong to quite distinct schools of thought, yet there is in them no word of such superstition. Here, at least, the Wisdom of Socrates is justified of her children.

A New Attitude

Aristotle, Plato's pupil, held a modified form of his master's view on the soul. By the time of the death of Aristotle in 322 B.C. there had arisen a new attitude towards life and death among thinking Greeks. And soon after—about 300 B.C.—there was founded the great medical school of antiquity, that of Alexandria. The Greek physicians who gathered there had access to the works of Plato and Aristotle. They approached their task in a climate of opinion on the nature of the human body profoundly different from that of any of the "Hippocratic" age. With Alexandria we begin to hear of open dissection of the human body.

It is unnecessary here to detail the history of the Alexandrian medical school, but it is well to consider certain of the contrasts to our own outlook that it presented. Firstly, there was the extreme smallness of the public to which the ancient scientific writings appealed. Treatises that would now be accessible to students in tens of thousands reached then only a handful. Secondly, the number of learned centres was minute against those in our world or even in the mediaeval world. Some little dissection came to be sporadically practised at Smyrna, Corinth, Pergamum, and a few other centres, but Alexandria was the only effective anatomical centre. Were the civilization of Britain, or of France, or of the United States, or of Russia, or of them all, to be destroyed, a reconstruction of modern science would be possible because the scientific spirit and scientific writings are to be found in many centres all over the world. Not so in antiquity. Obliterate Alexandria and you would have destroyed its characteristic contribution to medicine—namely, human anatomy. And for

effective purposes Alexandria was obliterated on the death of its last Greek ruler, Cleopatra, in 30 B.C., when Egypt became a Roman province.

Influence of Rome

After that event human dissection continued in a few subsidiary centres for a generation or two. It had, however, quite ceased as an open practice both at Alexandria and elsewhere before A.D. 150. Despite the loss of the Alexandrian anatomical works, the names of the most important Greek exponents of the art there and elsewhere have survived. We can form a fair estimate of their achievements. These do not concern us for the moment, but we must consider certain consequences that flowed from the Romanization of the Greek world in general and of Alexandria in particular.

To a thoughtful man of the time, the spread of Roman power seemed a moral revolution or a spiritual reaction — according to his point of view. Both attitudes can be exemplified from writings of the time. The Romans, as a people, had the greatest respect for the dead and protected bodies by laws enforced with their habitual orderliness and methods of regimentation. But the basic folk-religion of the Romans peopled earth and water and air with innumerable supernatural beings. The Romans were, in this sense, the most superstitious of civilized peoples. The popular religions of the Empire became deeply tinged with thought of this type which the Roman populace eagerly absorbed from Oriental cults. Thus, despite the innumerable conflicts of the Romans with Barbarians in the extension or defence of their Empire, and despite the innumerable corpses of which their troops had systematically to dispose, there is no clear evidence of any exploration of the structure of such a body. Human dissection had ceased to be practicable, nor was its purpose generally understood. Till the end of the second century A.D. a human skeleton could be examined at Alexandria, but human anatomy was no longer seriously studied even there.

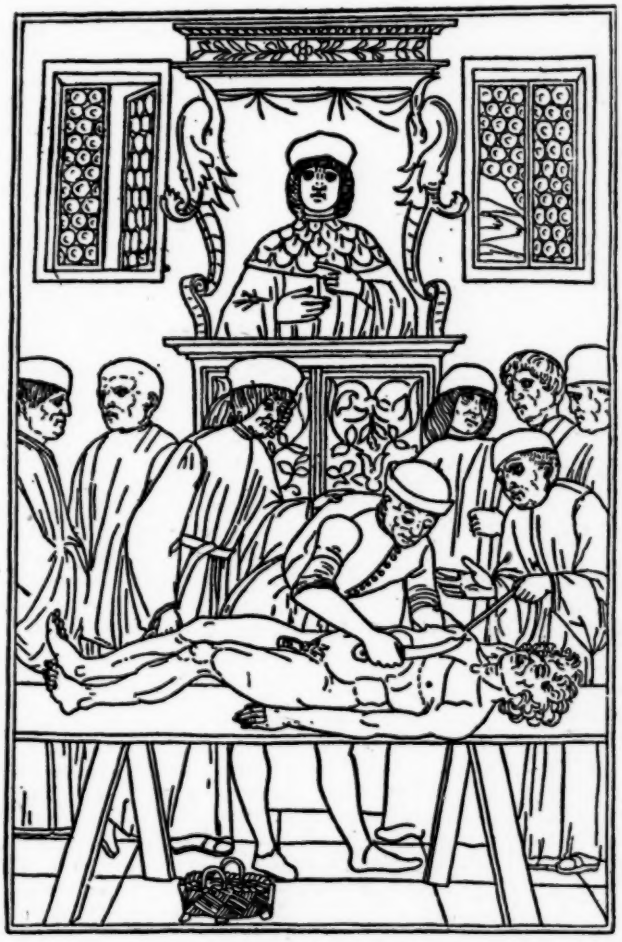

FIG. 2.—Academic "four-day Anatomy" at Bologna, from a book printed at Venice in 1493. The "professor" reads from a book on the desk of his throne-like "chair." The "demonstrator" points out the order of operation with his wand. Doctors and students stand around.

Animal Dissection and Experiment

One immediate result of the cessation of human dissection was at first, and in some respects, the opposite of what might be expected. The progress of anatomy at Alexandria from 300 to 30 B.C. had been sufficient to establish the value of the subject for medical practice and the general correspondence of human organs to those of other mammals. Now that human bodies were inaccessible, investigators turned to those of animals. This suggested experiment by vivisection, which was now practised with considerable scientific results. On the basis of such experiments, during the first two centuries of the Christian era, an ingenious, coherent, and quite workable system of physiology was gradually constructed (Fig. 3). It was easily understood and easily applied, and was a real aid in clinical practice. That it contained errors—what system does not?—did not alter the fact that medicine could profit by it. In this new light, physiological doctrine could be used, and was used, to direct intelligent and scientific modes of diagnosis and treatment. Thus, for example, the general properties of the nerves and of the spinal cord, the distribution of the spinal nerves, and the simple mechanics of muscular action were well explored. The broad conclusions reached were not vastly different from those which we now often apply in the first clinical examination of a patient.

The replacement of human bodies by those of apes and other animals for anatomical purposes was thus not all loss. Moreover, the change had certain other real advantages, especially, oddly enough, to surgery. It is to be remembered that the ancient medical man avoided opening the great cavities of the body. His operations were almost entirely for injuries and wounds. True, he would occasionally, and at extreme need, evacuate an empyema, trephine the skull, or even remove a spleen, but other abdominal, thoracic, or cranial procedures were almost unknown.

In the absence of preservatives and in a hot climate dissection had necessarily to be speedy. The bodies of monkeys, being smaller than those of men and easily procurable fresh and in numbers, had thus considerable advantages. Certain parts of apes closely resemble those of men. Especially is this so with the arm and hand. The differences are here chiefly in the level of division of the great flexor and extensor muscles, features themselves variable in human subjects. A good knowledge of the anatomy of a monkey's arm would be a better guide to such operative procedures as the ancients performed than a hastily acquired superficial knowledge of the anatomy of the human arm. Thus arose an effective physiology and anatomy based on animal dissection and experiment. It is preserved in certain works of Galen, who died in A.D. 201.

Passing of Ancient Anatomy

Despite Roman domination, or because of the peace imposed by Rome, the second century A.D. was one of brilliant achievement in the whole range of the then existing sciences, and specifically in anatomy. Yet the spirit of investigation ceased with remarkable abruptness at the end of that century, and we have to consider the reasons for this. The main intellectual background of the age was now the Stoic and Epicurean philosophies, both, for different reasons, indifferent if not unfriendly to the experimental method. The forms of oriental Paganism rapidly infiltrating the Empire were antithetic to science. The native Roman outlook was contemptuous to "disinterested"

knowledge. The temper of the time was tried and strained by barbarian incursions and ill attuned to patient research. The leaders of the rising sect of the Christians made little direct attack on science, but they certainly despised it. Thus the great syntheses of positive knowledge set out by Galen and Ptolemy in the second half of the second Christian century were not extended in the next age. The public that understood them rightly was rapidly diminishing. Science, in the sense of active conscious investigation, was a process not actively prosecuted again for twelve hundred years.

This funeral oration on ancient anatomy must not be closed without drawing attention to two very striking defects in its method. Firstly, the ancient anatomist did not use,

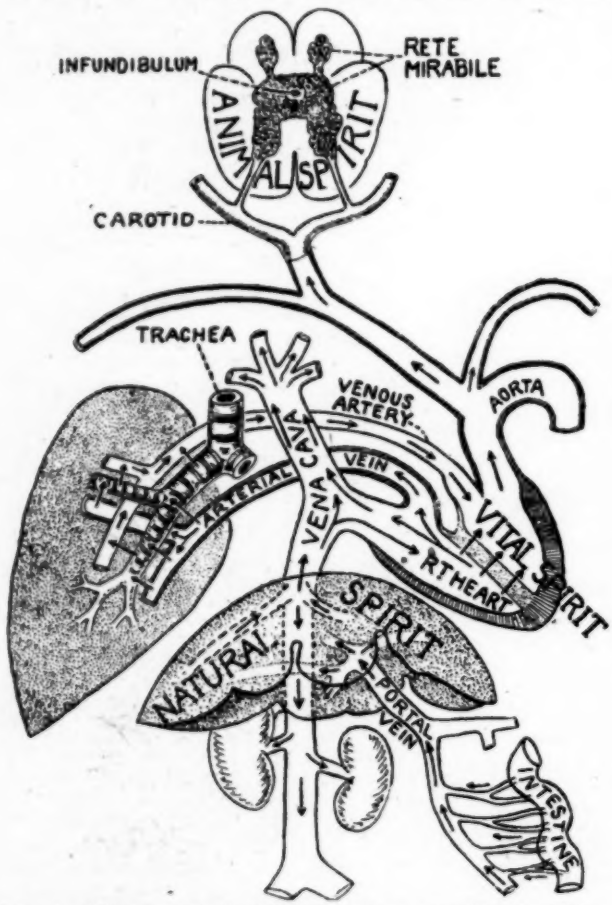

FIG. 3.—Diagram of physiological system according to Galen, based on the three "spirits" and the permeability of the interventricular septum. It is intelligible if the directions of the arrows be followed and it was, in fact, of some use clinically.

and could not use, the graphic method to aid his readers or his hearers in understanding or memorizing what he had to write or say. On occasion anatomical authors did employ semi-mathematical diagrams, comparing certain structures to geometric figures, but, for reasons which will presently emerge, they could go no further. Secondly, anatomical texts in antiquity were always in Greek, a language that had no classical or foreign source on which it could draw for its technical terms, as we ourselves now draw on Greek. Thus, without figures and without a technical vocabulary, the anatomical texts could be neither as clear nor as concise as are ours, nor could they be properly or easily studied apart from the object involved.

It is not necessary to follow here the depressing history of rational medicine in the thirteen centuries that followed A.D. 200. Some memory of the school of Alexandria survived, since, in a travesty of the ancient anatomico-physiological scheme, certain flat and hideous diagrams of the bodily parts, made after the Moslem conquest of Egypt in the seventh century, circulated both East and West. Except for these, our story is almost blank until the eleventh century. Between the eleventh and fourteenth centuries, however, more authentic, though still very distorted, remains of the ancient anatomical and physiological systems began to be recovered. They trickled back, not in Greek, but as second-, third-, or fourth-hand Latin translations from Arabic, Hebrew, or Syriac abstracts and interpretations of the Greek originals. These provided an impressively verbose body of anatomical and physiological tradition, which was organized into university curricula in the thirteenth, fourteenth, and fifteenth centuries. No single ancient anatomical text was, at this time, even approximately understood.

Some cursory dissection of the human body was introduced early in the fourteenth century in the Italian universities (Fig. 1). The "anatomies" were performed, not for purposes of investigation, but as a mere aid for the memorization of the Arabic–Latin texts. They hardly fulfilled even this purpose, but the practice of an occasional "four-day anatomy" spread to several universities outside Italy (Fig. 2). And so we come to the revival of true anatomy in the fifteenth century.

The Renaissance

In Italy the intellectual atmosphere of the fifteenth century, the "High Renaissance," was determined by many mutually interacting cross-currents, none of which can be completely separated from all the others. Thus, in our field, if anatomy influenced art, surely art equally influenced anatomy. Again, the ancient physiology was revived and better presented than in antiquity itself and came to affect the philosophy of the day, but was certainly affected by that philosophy. Such couplings might be multiplied indefinitely and far beyond the region of our discussion. It was just because of this interdigitation of the regions of intellectual interest that the great figures of Renaissance Italy, such as Alberti, Leonardo, Michelangelo, seem so incredibly versatile. They did not recognize, and they would not even have understood, the fragmentation of knowledge which has become a second nature with us.

Among the welter of interrelated activities that characterized the period, there were four which made a special impact on anatomy. Between them they determined its course and deflected it from being a mere rebirth of the ancient discipline. The four great factors that determined the course of anatomical development all took definitive form within half a century. First was the rise of the science of perspective. Second was the intimately related development of skill in exact representational drawing. Third was the publication of the ancient anatomical texts from which the new anatomy could take its start. Fourth was the perfection of the art of book illustration, so that the anatomist could at last present his findings graphically and acceptably to a wide audience.

Perspective Science and Representational Skill

First, as regards perspective. Artists had always felt the difficulty of representing three-dimensional objects on two-dimensional surfaces. This is the problem of perspective. One way of evading it, freely adopted by ancient artists of many lands, was the use of bas-relief. Another evasion was the adoption of arbitrary rules of representation. The impossible contortions of Egyptian figures, for example, which habitually display the head from the side, the arms and trunk from the front, and the hips and legs again from the side, are the result, as all perspective must be, of the adoption of a convention. All ancient painting and drawing on the flat adopted some device of this sort. All of it, even the best, seems to us to fail when considered from the representational or, as we sometimes call it, the "photographic" point of view. The history of perspective before the great Renaissance artists is complex and does not directly concern us here. It suffices to say that neither the Egyptians, nor the Greeks, nor the Romans, nor the mediaeval peoples of the West, attained any satisfactory solution of the problem, though the search for a solution proceeded through all their histories.

Many conventions of perspective are thus possible, but we now know that there is one, and one only, which can

be called "scientific." Though a convention, it is scientific because, given certain conditions, its truth can, at any time, be demonstrated at will and its accuracy estimated. This convention assumes that vision is monocular and that the position of the observing eye is fixed. Given these conditions the results follow with mathematical certainty. The evolution of this conception was, of course, of high importance for art. Perhaps it is not sufficiently recognized that for science it was among the most fate-fraught discoveries of all time. Without scientific perspective it is impossible adequately to demonstrate the theorems either of mechanics or of solid geometry. Without scientific perspective the development of modern architecture and crystallography, engineering, as well as many of the findings of the biological sciences, and specifically of anatomy, would have been impossible. Perspective is fundamental to modern science.

The method of scientific perspective involves the rule of a single vanishing-point and is sometimes called "Leonardian perspective." Leonardo (1452–1519) was certainly its greatest exponent, but, like most discoveries of the first rank, it was the product of many minds and has an evolutionary history. The largest contributor to its fundamental laws was probably the Italian architect, painter, musician, and poet, L. A. Alberti (1404–72). By the mid-fifteenth century he had worked out the fundamental rules of the subject on an experimental basis.

Before 1470 the young Leonardo was busy practising the new invention with enthusiasm. In the last year or two of the fifteenth century and in the first decade of the sixteenth he was applying it to anatomy. With this new instrument of scientific perspective he was able to represent the detailed structure of the body with a vividness and truth unapproached in any previous age. Certain of the ancient anatomists, and a few even in the later Middle Ages, had a fair idea of some of the organs and systems of the body. What they had not, and what Leonardo was the first to provide and portray, was the idea of the relationships of bodily parts to each other. In this very important sense, Leonardo was the founder of modern anatomy and, with it, of modern physiology. Whatever influence he may have had directly in developing anatomy, it is highly significant that two primal skills, great power in handling perspective and extraordinary facility in drawing, should have been united in this great anatomical pioneer.

Publication of Ancient Anatomical Texts

We turn now to the third basic factor in anatomical development, the recovery of the ancient texts. At the end of the fifteenth century very few of the Greek anatomical works were available, and these only in very inferior translations or versions. By the time that the sixteenth century had run a third of its course, almost the entire corpus of Greek anatomy and physiology, as we know it to-day, had become available in fairly reliable translations, made direct from the original tongue. These translations were first issued mainly by printers at Paris. They had almost completed their task by 1533, when the young Vesalius (1514–64) reached there. Owing to the ineradicable tendency of learning to departmentalize, owing to the endless struggle between letter and spirit, owing to man's weakness for institutions as against their purpose, the very recovery of the ancient anatomical texts, which Leonardo had only just begun to enjoy, now became a foe to the proper development of the subject of which they treated.

During the first third of the sixteenth century, not only were the Greek texts recovered and competently rendered into Latin, but at Paris and Bologna a regular technique of anatomization was systematized. This passed very considerably beyond anything that the Middle Ages had seen. But, except for Leonardo, there were only the most transient attempts, for a whole generation, to apply to anatomy the methods of the new representational art. Its devices were neglected or actively opposed by university professors, who jealously guarded the vested interests of so-called *Humanism*. And at this time, and perhaps still, Humanism was most unfortunately identified with knowledge of ancient texts, of ancient literature, and of ancient thought.

Vesalius, and Modernization of Anatomical Printing

We pass now to the fourth cornerstone of modern anatomy, almost personified in one man. Vesalius was the first who commanded at once a knowledge of those texts, a wide practical experience of anatomy, and the services of artists trained in Leonardian perspective. He had the judgment and power to correlate all these. But, last and not least, his resources enabled him to build on our fourth corner-stone, the art of a great printer and his great wood-cutters. With Vesalius, anatomy therefore became modern at one bound, so far as the printed book was concerned. We have learned very much since his time and he made many mistakes, but in method we are not very far from him.

There are historic figures whose attainments are so outstanding that they are apt to be misrepresented and indeed victimized by hero-worshippers. Leonardo is one such sufferer, Vesalius another. Both had very human weaknesses, and, even allowing for the pioneer character of their work, both made anatomical errors and omissions that are difficult to explain. Some of Leonardo's anatomical omissions are perhaps more understandable in view of his dearth of material. He sometimes erred too, as did Vesalius, by following tradition too faithfully. Yet it is hard to excuse, for example, his division of the human placenta into cotyledons in his noble and moving representation of the child dreaming in its mother's womb. But when Vesalius ascribes to man the great veins of an ungulate, we can only say that he is cribbing from Galen at his worst. Moreover, Vesalius wellnigh missed the importance of relationships in which Leonardo had led the way and also the kindred significance of estimating the relative sizes of adjacent organs. On the latter point he was corrected by his near contemporary, Eustachius (fl. 1520–74), whose worth has been too little considered (Fig. 4).

FIG. 4.—Dissection of sympathetic system by Eustachius of about 1570. It was hardly improved until well into the nineteenth century.

The anatomical work neither of Leonardo nor of Eustachius was accessible in the sixteenth century. That of Vesalius was, from the first, a prized piece, but there was no room for his vast folio on the ordinary student's desk. Among the earliest general anatomical works suitable for students were the *Institutiones anatomicae* (1611) of the Dane, Caspar Bartholin (1585–1629), which was derived directly from the work of Vesalius, and from him came, in due course, the succession of students' textbooks on anatomy and physiology down to our own day. Thus are the generations bound together.

LANDRY-GUILLAIN-BARRÉ SYNDROME*: CARDIOVASCULAR COMPLICATIONS

TREATMENT WITH A.C.T.H. AND CORTISONE

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The clinical manifestations of the Landry–Guillain–Barré syndrome are usually confined to the nervous system, and death, if it occurs, is in most cases due directly or indirectly to respiratory failure. Occasionally, however, the disease is complicated by circulatory collapse, which has been accepted as a complication since Osler (1892) mentioned "paralysis of the heart" as a possible mode of death. In a series of 50 fatal cases Haymaker and Kernohan (1949) found that circulatory failure was responsible for the death of three patients, and Dempsey *et al.* (1948) mention one instance in five deaths occurring in a series of 15 cases. The true incidence of circulatory failure is, however, difficult to assess because of possible confusion with the more frequent terminal event of respiratory failure (Kolle *et al.*, 1952). Usually the circulatory disturbance has been ascribed to "peripheral circulatory failure" and characterized by restlessness, sweating, cyanosis, coldness of the periphery, and marked hypotension. Less often there has been hypertension (Janet *et al.*, 1941; Haymaker and Kernohan, 1949; McDowell and Plum, 1951) and, as in acute anterior poliomyelitis (Bolt *et al.*, 1951; McDowell and Plum, 1951), this is almost certainly caused by carbon dioxide retention and hypoxia due to respiratory insufficiency, and often the fluctuations in blood pressure can be related to changes in the degree of respiratory embarrassment (McDowell and Plum, 1951).

The mechanism of the disturbance characterized by hypotensive circulatory failure is uncertain, but several factors have been suggested.

Disturbances of Cardiac Rate and Rhythm.—Sinus tachycardia of 100–120 a minute and unrelated to pyrexia is not uncommon in the Landry–Guillain–Barré syndrome (Bradford *et al.*, 1919; Radermecker, 1944); it may occur at any stage of the disease, but particularly terminally and when the neurological involvement is at its height (Susman and Maddox, 1940). A supraventricular tachycardia of 190 and auricular flutter and fibrillation have also been reported (Bradford *et al.*, 1919; Johnson, 1949; MacNeal and Bland, 1950; Wilkins, 1953). These arrhythmias have been related to respiratory insufficiency, involvement of the myocardium, and lesions in the autonomic nerve supply to the heart.

Involvement of the Myocardium.—In the 50 fatal cases of the Landry–Guillain–Barré syndrome described by Haymaker and Kernohan (1949), seven were found to have myocardial lesions at necropsy, but only one death appears to have been due to cardiac failure (Case 27). Although the oft-quoted case of McIntyre (1937) must be discounted because diphtheria cannot be excluded, other authors have described electrocardiographic evidence of myocarditis (Hand and Rudoy, 1948; Klein, 1954) and diffuse interstitial infiltration of the myocardium with mononuclear and polymorphonuclear cells, as well as necrosis of the muscle fibres (Péhu and Dechaume, 1927; Sabin and Aring, 1941; Klein, 1954). Similar myocardial changes are not uncommon in poliomyelitis (Teloh, 1953; and others).

Involvement of the Autonomic Nervous System.—Cardiovascular complications of the Landry–Guillain–Barré syndrome may occur in association with involvement of the brain stem (Guillain, 1936). Roseman and Aring (1941) have described pathological lesions in or near the vagal nuclei, and, although no clinico-pathological correlation has been made, several authors attribute the cardiovascular abnormalities in their patients to involvement of the vagal centre (Johnson, 1949; MacNeal and Bland, 1950; Wilkins, 1953).

Histological changes have also been reported in sympathetic ganglia and nerves (Radermecker, 1944; Haymaker and Kernohan, 1949), but no association has been noted with the clinical manifestations.

The present communication is concerned with the circulatory failure which occurred in three patients with the Landry–Guillain–Barré syndrome. One of them (Case 2) seemed to benefit greatly in respect of both the neurological disturbance and the cardiovascular complication from treatment with cortisone, and the effect of corticotrophin (A.C.T.H.) and cortisone on the disease is discussed.

Case 1

A housewife aged 63, who had suffered from chronic bronchitis for many years, was admitted to Hammersmith Hospital on February 10, 1953, and died six days later. Three weeks before admission she had nasal catarrh and a sore throat, associated later with a productive cough. She was recovering when, ten days before admission, she noticed weakness of the legs, arms, and hands. Her calves ached, she had paraesthesia in the finger-tips, and her hands were clumsy.

Examination.—She was obese and anxious. Her mental state was normal, but her intelligence was low. The cranial nerves were normal. Although all movements were possible, the limbs showed severe symmetrical weakness, more marked proximally. Respiratory movements were poor and the power of the abdominal muscles could not be evaluated accurately because of the obesity. All tendon reflexes were absent and the plantar responses flexor. Vibration and postural senses were impaired in the feet, but, so far as could be assessed, other modalities were normal. She was apyrexial but had a persistent regular tachycardia of 90 to 106. The apex beat was not defined, but the impulse suggested some left ventricular hypertrophy. The blood pressure was 170/120 mm. Hg. Scattered rales were heard over the lung fields.

Investigations.—The only abnormality in the cerebrospinal fluid was a protein content of 90 mg. per 100 ml. The blood sedimentation rate was 15 mm. in one hour (Westergren). A throat swab showed no pathogens (including *C. diphtheriae*). The urine was normal.

Progress.—Penicillin (500,000 units intramuscularly six-hourly) was given throughout. On the third day after

*Landry's paralysis and the Guillain-Barré syndrome are not distinct entities, but are manifestations of a number of clinically indistinguishable diseases. To avoid confusion in terminology, the name Landry–Guillain–Barré syndrome, as proposed by Haymaker and Kernohan (1949), should be employed until more precise knowledge regarding aetiology is available.

admission respiratory movement was limited to the upper intercostal and accessory muscles, and assistance was given with a Paul-Bragg respirator. This was used rather than a Both apparatus because the patient became distressed when lying flat, on account of her obesity and chronic bronchitis. The development of dysphagia necessitated tube feeding. Respiratory paralysis became more pronounced, and sticky sputum which she could not expectorate further impaired her breathing. Repeated aspiration of mucopus from the trachea and bronchi was necessary to maintain an unobstructed airway. On her fifth day in hospital she was put in a Both respirator, but was unable to synchronize her remaining respiratory activity with the machine, and had to be returned to the Paul-Bragg apparatus and given continuous oxygen inhalation. At this time her alkali reserve was 20.5 mEq per litre.

After 17 hours of severe respiratory difficulty her condition suddenly deteriorated. She became comatose, with pin-point pupils. The pulse rate was 72 and the blood pressure 70/0 mm. Hg, although her respiratory function had not deteriorated further and her face showed a bright pink flush. As it was thought possible that she was suffering from carbon dioxide retention, the oxygen was discontinued and she slowly regained consciousness. However, the picture remained one of "peripheral circulatory failure" and the blood pressure became unrecordable. Intramuscular methedrine and an intravenous infusion of noradrenaline produced only a transient rise in blood pressure, and the patient died in deep terminal cyanosis 11 hours after the collapse.

Post-mortem Examination.—Abnormal findings were few. *Heart:* the myocardium was healthy despite severe atheroma of the coronary arteries; the right ventricle was slightly dilated, and there was hypertrophy of both ventricular walls; no histological evidence of myocarditis was found in the sections examined. *Lungs:* tracheitis, mucopus in the bronchi, and oedema of the lower lobes were found. *Kidneys* showed senile arteriosclerosis. *Liver:* there was increased round-cell infiltration of the portal tracts. *Brain:* sections of the medulla and pons were normal at all levels. *Spinal cord and roots:* sections from many levels stained with haematoxylin-eosin, Weigert-Pal, and Marchi techniques, as well as frozen sections for fat, were normal. The posterior nerve root ganglia of T 5 and T 12 were also normal. *Autonomic system:* the thoracic chain was normal on histological examination. *Peripheral nerves:* a variety of nerves from the arms and legs showed nothing abnormal.

Comment.—There seems to be little doubt that this patient was an example of the Landry-Guillain-Barré syndrome. She presented a difficult therapeutic problem because even before respiratory paralysis developed she had hypertension and her pulmonary function was limited by obesity and chronic bronchitis. The terminal event was circulatory failure. The inability to demonstrate any pathological findings in the nervous system by the limited methods at present available is not unusual; absence of histological changes was also noted by Thorner *et al.* (1940) in more than 30% of cases of Landry's paralysis.

Case 2

A trackman on the London Underground, aged 45, was admitted to Hammersmith Hospital on February 3, 1953. One month previously he had noticed a dull pain in his lower back which radiated down the backs of his legs to the ankles. It had the characteristics of root pain, and gradually increased in severity. For three weeks he had experienced constipation and hesitancy of micturition as well as intermittent paraesthesiae in his left arm.

Examination.—He was an obese cheerful man with abnormalities confined to his legs. The quadriceps were weak on both sides, and all reflexes were absent, whereas in the arms they were brisk and equal. The plantar responses were flexor. There was indefinite hypalgesia and hypaesthesia in the right leg peripherally. The cardiovascular system was normal except for a persistent tachycardia of 90-100 and a blood pressure of 140/100.

Investigations.—The C.S.F. pressure was 200 mm. water; there was no manometric block. The C.S.F. contained 4 lymphocytes per c.mm.; protein 300 mg. per 100 ml.; the Wassermann reaction was negative; the Lange test showed no change. *X*-ray films of spine and chest were normal. The blood Wassermann and Kahn reactions were negative; the sedimentation rate was 12 mm. in one hour (Westergren). The urine was normal, there being no increase in coproporphyrin and no porphobilinogen or uroporphyrin. The electrocardiogram was normal.

Progress.—Within a week the leg weakness had involved all muscle groups and the arm reflexes had disappeared. His progress was now slowly downhill, and over the next month his limbs and trunk became completely paralysed and more definite sensory changes were detected peripherally in the limbs. Even when the quadriplegia was at its maximum there was no cranial-nerve involvement and respiratory function was satisfactory despite some weakness of the intercostal muscles. The diaphragm was never affected. Micturition was at times difficult, but catheterization was not required. A pyruvate metabolism test at this time was normal.

In the eighth week of his illness, when the limb and trunk paralysis was at its maximum, the patient had an attack of nocturnal breathlessness, precipitated by slipping off his pillows. Nevertheless, respiratory function was still good. The pulse rate rose to 120 and the blood pressure was 120/80. A few hours later his condition deteriorated rapidly and he went into a state of peripheral circulatory failure. Respiration was normal, but the pulse was 110 with frequent extrasystoles. The blood pressure was unrecordable and the peripheral pulses could not be felt. He was mentally confused and very restless, was slightly cyanosed, and his skin was cold and clammy. Up to the time of this sudden collapse renal function had been normal. An E.C.G. showed a nodal tachycardia of 100-110, elevation of the ST segments in Leads V_{4-6}, and tall gothic T waves in Leads II and III and V_{4-7} changes consistent with hyperkalaemia (Fig. 1).

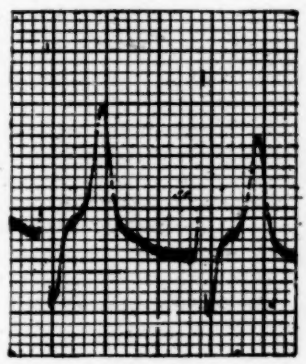

FIG. 1.—Case 2. E.C.G.; Lead V_4 during the circulatory failure.

He seemed to be dying. In order to determine whether the circulatory state was due to a low cardiac output or to a reduction in peripheral resistance, a catheter was passed into the right atrium, oxygen consumption was measured with a spirometer, and a needle was inserted into the brachial artery. Oxygen consumption was 400 ml. a minute, in keeping with his restlessness. The arterial blood contained 15.6 volumes of oxygen per 100 ml. (78% saturated) and the mixed venous blood contained 6 volumes (30% saturated). The cardiac output was 4.2 litres a minute (a low figure in relation to his metabolic needs). The pressure in the right atrium was raised above normal (+8 mm. Hg) and the pressure in the brachial artery was 90/80 mm. Hg. The peripheral resistance was 1,620 dynes sec. cm.$^{-5}$, which is not strikingly lower than normal, and there was no evidence of a significant loss of peripheral vascular tone. Analysis of a venous blood sample at this time showed a raised potassium concentration of 6.8 mEq per litre, a reduced sodium of 125 mEq per litre, chloride normal at 98 mEq per litre, CO_2-combining power 20 mEq per litre, and glucose 145 mg. per 100 ml.

The patient was digitalized with 1 mg. of digoxin intravenously, followed by 0.5 mg. six-hourly by mouth, and was also given 75 mg. of cortisone six-hourly by mouth. Within seven hours there was a striking improvement in his condition. He was warmer, rational, and less cyanosed, with complete absence of his earlier restlessness. The pulse rate had fallen to 100 and the blood pressure had risen to

120/60. During the next day the jugular venous pressure returned to normal. The pulse rate persisted at 110 and the blood pressure rose to 130/85. The E.C.G. (Fig. 2) showed changes due to digitalis, but the T waves were now normal. The serum potassium was 4.7 and the sodium 131 mEq per litre.

Four days after this acute episode improvement in muscle power was noted for the first time. One month later he could sit up unaided, and after two months he could walk with support. The weakness disappeared in the reverse order of its appearance. He was discharged six months after the onset of his illness; sensation was normal, but there was still slight bilateral weakness of foot dorsiflexion, and all the tendon reflexes were absent. One year later he had no complaints, his cardiovascular and nervous systems were normal, and he had returned to work.

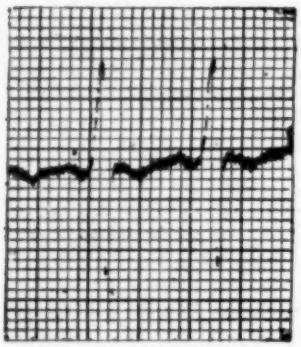

FIG. 2.—Case 2. Lead V_4 after recovery.

Comment.—This case is an example of the slowly progressive type of the Landry-Guillain-Barré syndrome. The muscle weakness was not maximal until the eighth week of the illness, and it was at this time that the acute circulatory failure occurred.

Case 3

A company executive aged 30 was admitted to the National Hospital, Queen Square, on April 8, 1954. Ten days before, in Khartoum, he had developed back pain, headache, and neck stiffness. There had been no preceding illness. Weakness of the limbs developed rapidly and it became necessary to aid respiration.

Examination.—He was slightly cyanosed and sweating. There was severe weakness of limb and trunk muscles, only slight diaphragmatic movements being present. All tendon reflexes were absent and peripheral sensory changes were found. The cardiovascular system was normal; blood pressure was 150/90 and pulse rate 60 to 80.

Investigations.—The only abnormality in the C.S.F. was a protein content of 350 mg. per 100 ml. The blood serum electrolytes and alkali reserve were normal. The E.C.G. was normal.

Progress.—The patient was treated in a Siebe-Gorman respirator, but he improved steadily and within a few days could be weaned from the apparatus. Two months after admission his respiratory function had improved (vital capacity 1 litre) and the power of his limbs was increased. However, without any apparent neurological, cardiovascular, or respiratory change, he had periods of altered personality. During one of these, on June 29, he became confused and irrational, the heart sounds were faint, and a pericardial friction rub was heard. His blood pressure was normal, but the pulse rate had risen to 120–140. The E.C.G. showed flattening of the T waves in all leads but no displacement of the ST segments. There was increased weakness of the limb and intercostal muscles. The vital capacity fell to 400 ml. and he was placed in the respirator again. Five hours later he began to show signs of circulatory failure; his blood pressure was 85/60 and the pulse thready. Serum electrolytes and urinary output were normal both before and during this episode.

He was given 300 mg. of cortisone by mouth during the next 24 hours and thereafter 50 mg. daily. An intravenous infusion of plasma containing 80 mg. of noradrenaline per 500 ml. was begun, and the rate was adjusted to maintain a blood pressure of 120/80. After 13 hours the infusion was discontinued, following which there was a transient fall in blood pressure with tachycardia lasting about two hours.

Recovery now began to take place, and it was soon possible to remove him from the respirator for increasing periods. Four months later he was improving slowly, but some limb weakness persisted and his vital capacity was still low (1,200 ml.).

Comment.—In this case the illness in its early phase was typical of the Landry-Guillain-Barré syndrome. It was, however, complicated by a recrudescence of respiratory paralysis associated with pericarditis and circulatory collapse.

Discussion

In all three of these patients the Landry-Guillain-Barré syndrome was complicated by circulatory collapse, the predominant feature of which was hypotension. The precise mechanisms for this disturbance remain uncertain, nor is it clear that the same factors were responsible in each case.

In Case 3 the circulatory failure was associated with a recrudescence of muscular weakness and the development of a pericardial friction rub. This suggests that the relapse was due to a reactivation of the disease process which involved the pericardium and also the myocardium, since the circulatory failure and hypotension are not usual features of acute pericarditis. Although respiratory failure also occurred at this time, there was no biochemical evidence of carbon-dioxide retention or depletion, and no circulatory disturbance had occurred when the respiratory insufficiency was equally severe in the earlier phases of the illness.

In Case 2 there was evidence of disturbed myocardial function, which occurred at the time of maximum neurological involvement and which was unassociated with any respiratory muscle failure. The onset of the circulatory disturbance was heralded by an attack of nocturnal dyspnoea, presumably due to left ventricular failure, and followed by severe hypotension and impalpable peripheral pulses. The cardiac output of 4.2 litres a minute was low when considered in relation to the patient's size, the extreme degree of restlessness, and the marked unsaturation of mixed venous blood indicating that the tissues were extracting an unusually large amount of oxygen from the circulating blood. Although there was a nodal tachycardia of 110 this was neither sufficiently rapid nor sufficiently prolonged to be the cause of the heart failure, and, when the circulatory collapse had improved, the heart rate remained rapid for several days without evidence of cardiac failure.

An important finding was the hyperkalaemia and the hyponatraemia. Potassium intoxication can cause a circulatory state indistinguishable from that presented by the patient, but he was not receiving more than the normal dietary intake of potassium, and his renal function and urine output were normal until the time of the acute episode. The electrolyte disturbances could have been a primary event in the circulatory disturbance if the patient was suffering from acute adrenal insufficiency, or if large amounts of potassium were being liberated from the paralysed muscles into the extracellular phase. We have no data to confirm or exclude these possibilities. Sabin and Aring (1941) have described histological changes in the suprarenal glands of patients dying with the Landry-Guillain-Barré syndrome, but in their 50 fatal cases Haymaker and Kernohan (1949) did not find significant adrenal abnormalities.

Hyponatraemia occurs not uncommonly in heart failure following treatment with mercurial diuretics (Stock *et al.*, 1951; Welt, 1952) and in myocardial infarction even before treatment of any sort has been given. In these cases the serum potassium concentration is usually low, but Bellet (1952) has encountered hyperkalaemia in patients with myocardial infarction, and attributes this to breakdown of the necrotic lesion in the heart, dehydration, and the shock-like state with coexistent oliguria. Thus it is difficult to decide whether the hyperkalaemia in this patient was a primary event and responsible for the circulatory collapse or secondary to involvement of the myocardium by the disease process. The response to digoxin and cortisone was dramatic. The former would be expected to improve the

myocardial function and the latter to correct the electrolyte disturbances and perhaps influence the disease process in the heart muscle. Within seven hours the patient's moribund condition had improved greatly, and it is reasonable to believe that a large part of this response was attributable to the effect of cortisone.

The first patient was older than the others, and handicapped by obesity, chronic bronchitis, and hypertension. It is possible that coexistent heart disease may explain the higher mortality in older patients who develop the Landry–Guillain–Barré syndrome—for example, Case 7 of Lassen and Fog (1943). The onset of circulatory failure coincided with maximum involvement of the nervous system and occurred after 17 hours of respiratory difficulty. The post-mortem findings were not helpful in elucidating the mechanisms involved, and in the absence of apparent myocardial involvement it remains uncertain whether carbon dioxide retention or further extension of the disease process in the brain stem (as suggested by the pin-point pupils and comatose state) was of importance.

The improvement in the cardiovascular state of Case 2 may in part have been due to treatment with cortisone, and recovery of muscular power also began to occur following cortisone in Cases 2 and 3. If, as has been suggested (Bannwarth, 1943), the Landry–Guillain–Barré syndrome is due to a hypersensitivity reaction of the nervous system rather than to a virus infection, the use of A.C.T.H. or cortisone seems reasonable on the analogy with rheumatic fever. Evaluation of the response is difficult because the course of the disease is variable and spontaneous remissions and relapses are common.

Since 1952 the results of treatment with A.C.T.H. or cortisone have been reported in 46 cases of the syndrome. In 10 cases in which the drug was ineffective details are not available (Merritt, 1952; Eaton, 1953; Plum, 1953). A further eight cases were associated with specific diseases such as infectious mononucleosis or polyarteritis nodosa (Wilkins, 1953; Fiese *et al.*, 1953; Plum, 1953; Plough and Ayerle, 1953; Stýblová and Dejmal, 1953; Liversedge and Leather, 1953). The remaining 28 cases had the usual clinical picture (Seltzer *et al.*, 1952; Stillman and Ganong, 1952; Tolentino, 1952; Newey and Lubin, 1953; Blood *et al.*, 1953; de Assis and Netto, 1953; de Assis, 1953; Senseman and Greenstein, 1953; Vernon, 1954; Lûzes, 1954; Gilsanz *et al.*, 1954; Tupper and Foster, 1954; Essellier and Kopp, 1954; Foster and Pokorny, 1954; Guiang and Leones-Guiang, 1954; Bolt *et al.*, 1954). Nine, of whom five had bulbar involvement, showed dramatic improvement; in 12 the progression of the disease was halted and improvement took place; and in the remainder no change occurred. None appear to have been made worse. One patient relapsed while receiving A.C.T.H., but improvement occurred again when cortisone was given (Stillman and Ganong, 1952), and in two patients Plum (1953) was able to demonstrate the beneficial effects of cortisone as compared with a placebo.

Thus it seems that treatment with corticosteroids deserves further consideration, despite the objections of Guillain (1953) and in spite of the fact that Grant and Leopold (1954) have described a patient who, while receiving an adequate dose of cortisone for rheumatoid arthritis, developed the Landry–Guillain–Barré syndrome. At present perhaps such treatment is indicated only in patients showing relentless deterioration, having relapses, or in those with hypotensive cardiovascular collapse; spontaneous recovery from the latter, however, has been observed (Smith *et al.*, 1954). Its use should also be considered in patients with bulbar involvement and respiratory failure, although recovery without treatment in even these cases is frequent. There is not enough evidence to indicate whether cortisone influences the outcome of the straightforward case, but it is possible that recovery may be accelerated and pain relieved (Stillman and Ganong, 1952; Lûzes, 1954; Foster and Pokorny, 1954). The steroid should be given in divided oral doses of 300 mg. during the first day, 200 mg. during the second, and 100 mg. daily thereafter. Since those patients who have responded dramatically have all been given the hormone early in the course of their disease, the institution of treatment should not be delayed.

When the clinical picture is complicated by circulatory collapse it is suggested that involvement of the myocardium rather than loss of peripheral vascular tone may be the cause. For this reason an infusion of noradrenaline should be given to combat the hypotension, together with digoxin and cortisone in the belief that these may improve the myocardial function and perhaps favourably influence the pathological process.

Summary

Three cases of the Landry–Guillain–Barré syndrome complicated by acute circulatory failure, which was fatal in one patient, are reported.

Evidence is presented to suggest that in some cases myocardial dysfunction is responsible for the circulatory complications.

The value of adrenocortical steroids in the uncomplicated disease is reviewed, and suggestions are offered for the treatment of the circulatory collapse.

There is some indication that cortisone may influence the course of the disease favourably, and further experience is justified.

We would like to thank the Medical Committee of the National Hospital, Queen Square, for permission to publish Case 3.

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THE USE OF OXYTETRACYCLINE IN PREVENTING OR DELAYING ISONIAZID RESISTANCE IN PULMONARY TUBERCULOSIS

A REPORT TO THE RESEARCH COMMITTEE OF THE TUBERCULOSIS SOCIETY OF SCOTLAND*

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The frequent emergence of drug-resistant tubercle bacilli in patients treated with streptomycin, with salts of *p*-aminosalicylic acid (P.A.S.), or with isonicotinic acid hydrazide (isoniazid) alone is now common knowledge (Dye *et al.*, 1953; Medical Research Council, 1948, 1950, 1952, 1953b). Following reports of the use of oxytetracycline ("terramycin") alone in patients suffering from pulmonary tuberculosis (Pfefer *et al.*, 1952; Söderholm, 1952) a number of workers (Des Autels, 1953; Miller *et al.*, 1952, 1953; Pfefer *et al.*, 1952; Rothstein and Johnson, 1952) investigated the effect of oxytetracycline in reducing the incidence of streptomycin resistance. The present report deals with the use of oxytetracycline in delaying or preventing the onset of isoniazid resistance.

Material

In the original series of Miller *et al.* (1952) treated with streptomycin and oxytetracycline, the latter was given in a dose of 5 g. daily. Ten patients in the present series were treated with this dose. In all of these the tubercle bacilli were already resistant to streptomycin or P.A.S., or to both. It was hoped by the combination of isoniazid and oxytetracycline to make a desperate case fit for surgery. It was later realized that, in view of the expense involved, a smaller dose of oxytetracycline would be desirable if it were effective. Consequently in a second series of 23 patients the oxytetracycline was given in a daily dose of 1 or 2 g., the patients being allotted to the 1-g. or 2-g. group according to a table of random numbers. It should be emphasized that the first series, given 5 g. daily, was not allotted in this way. In all except five of those given isoniazid with 1 or 2 g. of oxytetracycline daily, the bacilli were already resistant to streptomycin or P.A.S., or to both. In the five whose bacilli were sensitive the disease was of such extent and chronicity that only a limited response could be expected to any form of treatment.

The emergence of isoniazid-resistant organisms in these patients was compared with that in a previous series of patients with similar disease treated on isoniazid alone (Wallace *et al.*, 1954).

The treatment groups were as follows: (1) T1H group: oxytetracycline, 1 g. daily, in four doses of 0.25 g., plus isoniazid, 100 mg. twice a day. (2) T2H group: oxytetracycline, 2 g. daily in four doses of 0.5 g., plus isoniazid, 100 mg. twice a day. (3) T5H group: oxytetracycline, 5 g. daily, in four doses of 1.25 g., plus isoniazid, 100 mg. twice a day. (4) H group: isoniazid 100 mg. twice a day *alone*.

In all groups the minimum duration of treatment was three months.

In Table I are compared, for the different groups, pre-treatment radiographic appearances known to be associated with the emergence of drug resistance—namely, cavitation

TABLE I.—*Degree of Cavitation and Confluence in the Pre-treatment Radiographs*

Treatment Group	No. of Cases	Degree of Cavitation*				Degree of Confluence†			
		+++	++	+	Nil	+++	++	+	Nil
T1H ..	10	3	3	4	0	3	4	2	1
T2H ..	13	7	5	1	0	7	2	2	2
T5H ..	10	7	2	0	1	2	3	5	0
H ..	17	9	4	3	1	3	5	9	0

* Total diameters of cavities present: 5 cm. or above = +++, 2-4·9 cm. = ++, less than 2 cm. = +.

† Shadows confluent over three-quarters or more of one zone = +++, one-quarter to three-quarters of one zone = ++, less than one-quarter of one zone = +.

(Mitchell, 1949; Howard *et al.*, 1949; Howlett *et al.*, 1949) and confluence of shadows (Bignall *et al.*, 1950). It will be seen that the distribution is similar except that fewer patients in the T1H group had gross cavitation and more patients in the T2H group had grossly confluent shadows than in the other groups. As regards pre-treatment erythrocyte sedimentation rate (E.S.R.), shown in Table II, the H and

TABLE II.—*Pre-treatment Erythrocyte Sedimentation Rates*

Treatment Group	Total No. of Cases	E.S.R. (mm./hr. Westergren)			
		0–9	10–29	30–49	50 and Over
T1H	10	1	2	1	6
T2H	13	0	3	2	8
T5H	10	4	1	1	4
H	17	1	6	7	3

T5H groups tended to have lower levels than the other two groups. Too few patients were febrile for any useful comparison to be made between the groups. In general the patients in the trial had a chronic type of disease with moderate or gross cavitation. Most of them had previously received long courses of streptomycin and P.A.S., often in rhythms and doses now regarded as unsatisfactory, but none had had isoniazid.

Methods

The sputum was cultured on at least two occasions before the start of treatment and then at weekly intervals. Drug-sensitivity tests were carried out on the pre-treatment cultures and monthly thereafter. When resistance was encountered intermediate cultures were also tested in order to determine more accurately the time of onset of resistance. Cultures and isoniazid-sensitivity tests were performed by the methods recommended by the Medical Research Council (1953a). Isoniazid resistance was recorded as "sensitive" or as resistant to 0.2, 1, 5, 10, or 50 μg./ml. Cultures were considered to be resistant when 20 or more colonies were obtained on Löwenstein-Jensen slopes containing 0.2 μg. of isoniazid per ml. or above. In each case in which a culture resistant to 0.2 μg./ml. was obtained later cultures from the same patient showed a higher degree of resistance. For the oxytetracycline-sensitivity tests Dubos and Davis's (1946) liquid medium was used. The method was the same as that recommended by the Medical Research Council (1953a) for testing bacterial sensitivity to streptomycin,

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except that the readings were made after 12 days' incubation. All sensitivity tests were done by the same worker (S. M. S.).

Chest radiographs were taken monthly and radiographic assessments were made by an independent panel. The sedimentation rate and weight were also recorded monthly, and a note was made of the average evening temperature for the seven days preceding each monthly review. Symptoms attributable to drug toxicity were recorded at each monthly examination.

Results of Isoniazid-Resistance Tests

The results of the sputum examinations are shown in Table III. Within six months of starting treatment isoniazid-resistant organisms were isolated from 5 of the 10 patients

TABLE III.—*Bacteriological Results at End of Three Months' Treatment and Any Subsequent Development of Isoniazid Resistance*

Treatment Group	No. of Cases	No. of Cases at 3 Months			No. of Cases in which Isoniazid Resistance was First Demonstrated Later than 3 Months*	Total No. Isoniazid-resistant by 6 Months
		Sputum Negative	Sputum Positive and Isoniazid-sensitive	Sputum Positive and Isoniazid-resistant		
T1H ..	10	5	1	4	1 (3½)	5
T2H ..	13	6	4	3	2 (4). 1 (6)	6
T5H ..	10†	5	4	0	2 (5). 1 (15)†	2
H ..	17	6	0	11	1 (5)	12

* The figures in parentheses give the duration of treatment in months before the first isolation of isoniazid-resistant organisms.

† One patient had an isolated positive culture, but no growth was obtained on the sensitivity test. The sputum subsequently became negative until the fifteenth month of continuous treatment, when a resistant culture was obtained.

in the T1H group, from 6 of the 13 in the T2H group, from 2 of the 10 in the T5H group, and from 12 of the 17 in the H group. In addition, in the T5H group, a single positive culture resistant to isoniazid was obtained from one of the patients after 15 months of continuous treatment.

Isoniazid Resistance Emerging Within Three Months of Starting Treatment

From Table III it will be seen that of the five positive cultures at three months in the T1H group, four were resistant to isoniazid; of the seven positive cultures in the T2H group, three were resistant. In the T5H group none of the four positive cultures was isoniazid-resistant. All eleven positive cultures from the group on isoniazid alone were resistant. Sputum conversion occurred in about one-half of the cases in each of the groups given oxytetracycline. In about one-third of the group given isoniazid alone the sputum was negative on culture. In all treatment groups in which sputum conversion occurred the last positive culture was sensitive to isoniazid.

Isoniazid Resistance Emerging Later than Three Months after Starting Treatment

Resistance was first demonstrated later than the third month of treatment in eight of the cases (Table III). Of those who were sputum-negative at three months, resistant bacilli were subsequently isolated from one of the five patients in the T1H group, from two out of the six in the T2H group, from none in the T5H group, and from one of the six patients in the H group. Of those patients whose organisms were sensitive at the end of the third month of treatment, isoniazid resistance was later demonstrated in only three. In one, in the T2H group, resistant bacilli were isolated after four months' treatment. In the remaining two, in the T5H group, resistant organisms were isolated only after five months' treatment. In one other patient in the T5H group bacilli failed to grow in the sensitivity test performed after three months' treatment; after 15 months' continuous treatment an isolated culture was obtained which was resistant to isoniazid.

Details are as follows:

T1H Group.—Five cases were sputum-negative at three months. Of these, three were treated for three, four and a half, and five months respectively, at the end of which time they were still sputum-negative. In two thoracoplasty was carried out, and the third had a pneumonectomy. A fourth patient who had six months' treatment remained sputum-negative for a further period of three months. Subsequently the sputum became positive and the organisms were sensitive to isoniazid. The fifth patient had a pneumonectomy three and a half months after starting treatment. She had been sputum-negative from the 77th day of treatment, but cultures from the lung were resistant to isoniazid. The only patient in this group who was sputum-positive and whose organisms were sensitive to isoniazid at three months changed treatment after completing three months' oxytetracycline and isoniazid.

T2H Group.—Of the six cases sputum-negative at three months, two were treated for five and six months respectively and remained sputum-negative. A third case was treated for three months only. A positive culture was obtained three months later and the organisms were sensitive to isoniazid. Two cases remained sputum-negative until the end of the fourth and fifth month of treatment respectively. In both cases isoniazid-resistant organisms were then isolated from the sputum. The sixth case received oxytetracycline and isoniazid for three months only. He was then given P.A.S. and isoniazid. There were four patients from whom isoniazid-sensitive organisms were isolated at the end of three months' treatment. Two became sputum-negative by the end of the fourth month of treatment. One of these completed six months' treatment and remained sputum-negative. The other has received only four months' treatment so far. A further case has received five months' treatment. Isoniazid-sensitive organisms were isolated at four months, but the sputum was negative by the end of the fifth month. In the last case isoniazid-resistant organisms were isolated at the fourth month.

T5H Group.—Five patients were sputum-negative at three months. In one of these the sputum remained negative throughout five months of treatment. A left upper lobectomy was then performed; cultures from the lung lesions were sensitive to isoniazid. In a second patient who had nine months' treatment a single positive culture obtained at the sixth month was sensitive to isoniazid. The other three have completed only three to four months' treatment, and have so far remained sputum-negative. Five patients were sputum-positive at the end of three months' treatment. Two were negative by the fourth month. One of these subsequently had a thoracoplasty. In the second the sputum was negative up to the eighth month of treatment, when a right upper lobectomy was performed. Cultures on the material from the lung lesions were negative and inoculation into guinea-pigs produced only local glandular enlargement. Isoniazid-sensitivity tests are not yet available on the organisms from these lesions. In two patients who received over five months' treatment isoniazid-sensitive organisms were isolated at the fourth month, but resistant organisms were isolated at the fifth month. The fifth patient's sputum was positive after three months' treatment, but the bacilli failed to grow in the sensitivity test. Subsequently, weekly cultures were negative until, after fifteen months' continuous treatment, a single positive culture was obtained which proved resistant to isoniazid.

H Group.—Six cases were sputum-negative at three months. Two of these received isoniazid for six months and remained sputum-negative throughout treatment; one has remained sputum-negative for a subsequent twenty-two months off treatment; in the other, chemotherapy was changed at the end of the course of isoniazid. Two cases completed six months' isoniazid and remained sputum-negative after the end of treatment for three and four months respectively. Positive cultures obtained at these times were sensitive to isoniazid. A fifth case treated for six months remained sputum-negative until the fifth month, when isoniazid resistant organisms were isolated. In the sixth case chemotherapy was changed after three months' isoniazid. There were no patients in this group who were sputum-positive and whose organisms were sensitive to isoniazid after three months.

Oxytetracycline Sensitivity

Owing to the low incidence of oxytetracycline resistance in pulmonary tuberculosis so far reported, no definite criteria of resistance have yet been established. The results in the present series, shown in Table IV, suggest that no rise of resistance has occurred after three months' treatment. Oxytetracycline-resistance tests were available at four months on cultures from 11 patients, at five months from 9 patients, at six months from 5 patients, and at nine months from 1 patient. In no case was the resistance ratio greater than that found on the pre-treatment culture.

TABLE IV.—*Results of the Oxytetracycline-sensitivity Tests, Expressed as the Inhibitory Concentration in μg./ml. and as a Resistance Ratio Compared with the Standard H37Rv Strain, on the Pre-treatment Cultures and on those Isolated after Three Months' Treatment on 32 Patients*

Treatment Group	Results on Pre-treatment Cultures							Results on Cultures Isolated after 3 Months' Treatment							
	Total No. Tested	Inhibitory Conc., μg./ml.			Resistance Ratio			Total No. Tested	Inhibitory Conc., μg./ml.				Resistance Ratio		
		1	2	4	¼	½	1		1	2	4	8	¼	½	1
T1H..	10	2	2	6	2	3	5	5	3	0	2	0	3	0	2
T2H..	13	3	8	2	3	8	2	7	3	3	1	0	2	4	1
T5H..	9	3	4	2	3	4	2	4	0	2	1	1	0	2	2
Total	32	8	14	10	8	15	9	16	6	5	4	1	5	6	5

Clinical Progress.—This was assessed by the objective methods already detailed. There was no important difference between the groups after three months of treatment.

Toxic Effects Attributable to Oxytetracycline

Diarrhoea was noted in 2 cases of the T1H group, in 4 of the T2H group, and in 4 of the T5H group. In 3 of the 10 patients it was transient, occurring only over the first month. In only 2 of the 10 was the diarrhoea of any severity, but even in these it was not sufficient to interfere with therapy. Anorexia and slight vomiting occurred in four cases, but required no treatment. One case originally admitted to the T5H group had to be removed from the trial within the first week of treatment owing to intractable vomiting and diarrhoea. This case, therefore, is not included in any of the results. One case in the T2H group developed pruritus of the legs over the first three days of treatment; this was relieved by antihistamine drugs.

Discussion

It has been shown by Pfefer *et al.* (1952) and by Söderholm (1952) that oxytetracycline when used alone has little to offer in the treatment of pulmonary tuberculosis. When used in combination with streptomycin, however, the incidence of resistance to streptomycin can be greatly reduced (Des Autels, 1953; Miller *et al.*, 1952, 1953; Pfefer *et al.*, 1952; Rothstein and Johnson, 1952). When isoniazid is given with streptomycin or P.A.S., the incidence of drug resistance is markedly lowered, provided that the patient's organisms are fully sensitive at the start of treatment (Dye *et al.*, 1953; Medical Research Council, 1953b, 1953c; Pitts *et al.*, 1953). Both these combinations are now widely used, and with great success. Nevertheless there are a few patients whose organisms are resistant to streptomycin and P.A.S. owing either to previous unsatisfactory chemotherapy or to infection with resistant organisms (Thomas *et al.*, 1954). For such patients isoniazid is the only effective drug left, and it would be of great value to have a fourth drug which could be used to delay or prevent the onset of isoniazid resistance. The possible value of oxytetracycline for this purpose is examined in the present study. As the series consisted of patients who were thought likely to remain sputum-positive it was possible to obtain bacteriological results of negative value even from small groups.

There was no difference between the progress of the patients receiving oxytetracycline and isoniazid and those receiving isoniazid alone. Therefore no clinical evidence was found of the antagonism between these drugs that has been demonstrated in the laboratory (Mackaness and Smith, 1953). The object of using oxytetracycline was of course the hope that this drug would inhibit multiplication of the small number of isoniazid-resistant mutants which occur in any population of tubercle bacilli, and which in the presence of isoniazid may ultimately replace the sensitive organisms.

From the results shown in Table III it can be seen that in each of the oxytetracycline and isoniazid treatment groups sputum conversion occurred in approximately one-half of the cases by the end of the third month of treatment. In the isoniazid group this occurred in about one-third. The numbers in each group are small and the difference in the conversion rate is possibly due to chance.

There is no great difference in the incidence of isoniazid resistance in the H and T1H treatment groups, resistance having occurred in 11 of the 17 patients in the H group at the end of three months' treatment, compared with 4 out of 10 in the T1H group. In the T2H group isoniazid-resistant organisms occurred in only 3 of the 13 patients at the end of three months' treatment. Resistant bacilli were later found in 3 of the 10 patients in this group who were sputum-negative or whose organisms were still sensitive to isoniazid after three months' treatment, as compared with one of the six patients in the H group. Therefore in this small series, although isoniazid resistance developed less often in the T2H group than in the H group, the difference might well be due to chance. Neither T1H nor T2H can be recommended as satisfactory treatment regimes owing to the considerable incidence of isoniazid resistance in both groups.

Only 10 cases were treated with T5H, and therefore the results, though suggestive, need further confirmation. Although isoniazid resistance emerged in three of the cases, it occurred in none before the fifth month of treatment. In two, resistant bacilli were isolated at the end of the fifth month, and in the third only after fifteen months' continuous treatment, in spite of weekly cultures. These results suggest that by using oxytetracycline in a dose of 5 g. daily with isoniazid the period of effective chemotherapy—that is, the time before the emergence of isoniazid resistance—is likely to be considerably longer than with isoniazid alone or with T1H or T2H.

No oxytetracycline resistance was encountered in any of the treatment groups.

Although one case had to be removed from the trial within the first week of treatment with T5H because of severe vomiting and diarrhoea, in general the toxic effects of oxytetracycline were slight and did not prevent the continuation of treatment. Diarrhoea tended to occur within the first month, but generally it ceased spontaneously thereafter. The incidence of anorexia, vomiting, and diarrhoea was less than that reported by Miller *et al.* (1952, 1953), and no glossitis or cheilosis was seen.

It is probable that oxytetracycline, even in doses of 5 g. a day, is less effective than streptomycin or P.A.S. in delaying or preventing the emergence of isoniazid resistance. If oxytetracycline is to be used it is probably of little value at a lower dose than 4 to 5 g. a day, at least if given in four divided doses as in our series. At present prices the ratio of the cost of 5 g. of oxytetracycline with 200 mg. of isoniazid daily to 1 g. of streptomycin with 20 g. of sodium P.A.S. daily is 11 to 1. The use of oxytetracycline in preventing isoniazid resistance should therefore be restricted to the very few cases in which no other effective chemotherapy is available. Its principal value will probably lie in the preparation for radical surgery of patients whose organisms are resistant to both streptomycin and P.A.S. In fact, of the 10 cases in this series treated with isoniazid and 5 g. of oxytetracycline daily no fewer than five otherwise hopeless cases were made fit for surgery and now appear to have a relatively good prognosis.

Summary

Thirty-three cases of pulmonary tuberculosis were treated with oxytetracycline and isoniazid. Oxytetracycline was given in a dose of 1 g. daily (T1H) to 10 patients, 2 g. daily (T2H) to 13 patients, and 5 g. daily (T5H) to 10 patients. A group of 17 patients with similar disease, who had been treated with isoniazid alone (H group), was used for the purposes of comparison.

Sputum conversion occurred by the end of the third month of treatment in 5 of the 10 patients in the T1H group, in 6 of the 13 in the T2H group, and in 5 of the 10 patients in the T5H group. Six of the 17 patients in the H group had become sputum-negative over the same period.

Isoniazid-resistant organisms were isolated at some time from about one-half the patients in the T1H and the T2H groups and from about two-thirds in the H group; but in the T5H group resistant organisms were obtained from only 3 out of the 10 patients, and in none before the end of the fifth month of treatment.

No oxytetracycline resistance was encountered.

There was no important difference between the four treatment groups as regards clinical or radiological progress over the first three months of treatment.

Treatment of one patient in the T5H group had to be stopped after one week because of intractable diarrhoea and vomiting. Apart from this, the toxic effects attributable to oxytetracycline were slight.

Owing to the considerable incidence of isoniazid resistance in the T1H and T2H groups, neither method can be recommended as satisfactory in treatment. On the other hand, oxytetracycline in a dosage of 5 g. daily would seem to be of probable value in delaying or preventing the onset of isoniazid resistance, but this combination is likely to be less effective than that of streptomycin or P.A.S. with isoniazid; it is also very expensive.

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ADDENDUM.—Since this paper was submitted for publication the patients reported above, and three additional patients in the T5H group, have completed a minimum of six months' clinical and bacteriological observation. The one exception was a patient in the T5H group who discharged himself from hospital after three months; the remainder of the cases in the T5H group completed six months' treatment. The figures for isoniazid resistance within six months of starting treatment (three-month figures in parentheses) are now: for isoniazid alone, 12 (11) out of 17; T1H, 5 (4) out of 10; T2H, 7 (3) out of 13; and T5H, 2 out of 12 (0 out of 13 at three months). The difference between the H and T5H figures at three months is statistically significant ($P<0.01$). No oxytetracycline resistance was encountered.

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TREATMENT OF HAEMOCHROMATOSIS BY REPEATED VENESECTION

BY

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Repeated venesection is now being used in the treatment of haemochromatosis (Davis and Arrowsmith, 1953; Houston, 1953; Warthin *et al.*, 1953). It has been found that appreciable amounts of iron may be mobilized for haemoglobin formation in response to venesection and that the total amount of blood which can be removed without the development of anaemia is chiefly dependent on the available body iron store (S. Finch *et al.*, 1950). In haemochromatosis it is hoped by repeated bleeding to remove some of the enormous excess of iron deposited in the tissues and thereby halt the accompanying fibrosis and the clinical changes of the disease. The employment of venesection as a means of mobilizing the deposited iron in haemochromatosis is based mainly on theoretical considerations, and was first proposed by Balfour *et al.* (1942) and later by Schwartz and Blumenthal (1948) and by Granick (1949). The possible therapeutic use of venesection, however, is suggested by the rarity and late onset of haemochromatosis in women, in whom loss of iron through menstruation, pregnancy, and lactation is believed to suppress or delay the clinical expression of the disease (Houston, 1953).

A case of haemochromatosis, proved by skin biopsy and estimation of the serum iron and unsaturated iron-binding capacity (Houston and Thompson, 1953), has been treated by repeated venesection. During a period of two years 55 pints (31 litres) of blood, equivalent to approximately 15 g. of iron, have been removed. A severe anaemia developed at the end of this time and was preceded by a fall in serum iron, which suggested that the available body-iron stores had been exhausted. In spite of the anaemia, a definite improvement has been noted in the patient's condition.

Case Report

A man aged 55 came under observation in October, 1950, complaining of upper abdominal pain for two years, and increasing tiredness and pigmentation of the face for six months. He gave no family history suggestive of haemochromatosis and had had no previous illnesses other than an operation for duodenal ulcer in 1936. He had regularly drunk 6 to 8 pints (3.4 to 4.5 litres) of beer daily. On examination there was a marked grey-black pigmentation of the face, neck, and forearms, and the liver was enlarged and very tender, with a firm smooth edge palpable 4½ in. (12 cm.) below the right costal margin. The spleen was not felt, but free fluid was found in the abdomen, the abdominal girth being 44 in. (112 cm.). Examination of the urine revealed a mild glycosuria, but the liver-function tests and the blood count were completely normal. The diagnosis of haemochromatosis was established by skin

biopsy, which showed small scattered deposits of iron in the corium, particularly around the sweat glands.

He was admitted to hospital in October, 1950, December, 1951, and April, 1953, with exacerbation of upper abdominal pain, and on each occasion was reinvestigated and discharged after the pain had been relieved by a suitable period of rest. The glycosuria, which was present on repeated examination in 1950, was not found in 1951 or 1953, and the glucose-tolerance test, which was reported as being of the "lag type" in 1950 and 1951, was normal in 1953. The serum-protein and liver-function tests have been normal at each examination. Apart from the onset of impotence in 1950, the patient's condition remained more or less stationary throughout this time, and no further abnormality was discovered in any other system.

Withdrawals of 1 pint (570 ml.) of blood weekly by venesection were started in April, 1952, and were carried out in two series—the first from April to November, 1952, and the second from April to October, 1953. In the first series 35 pints (20 litres) of blood were removed without ill effect, the haemoglobin ranging from 13 to 16.3 g. per 100 ml.

Serum iron and unsaturated iron-binding capacity estimations were begun in March, 1953, just before the start of the second series of venesections. The serum iron was estimated by the method of Ramsay (1953) and the unsaturated iron-binding capacity by the method of Ventura (1952). Both methods were found to be satisfactory and reliable provided care was taken to prevent any haemolysis of specimens. The iron-free distilled water used in these estimations was obtained by running distilled water through a 4-foot (120-cm.) column of Biodeminrolit ion-exchange resin. The normal value for serum iron as given by Ramsay is 112–255 μg. per 100 ml. in males; Ventura found the serum unsaturated iron-binding capacity to be within the range 198–470 μg. per 100 ml. The initial finding of a serum iron of 286 μg. per 100 ml. and a fully saturated iron-binding capacity was confirmatory of the diagnosis of haemochromatosis (Houston and Thompson, 1953). The complete results, together with haemoglobin estimations, are shown in Fig. 1.

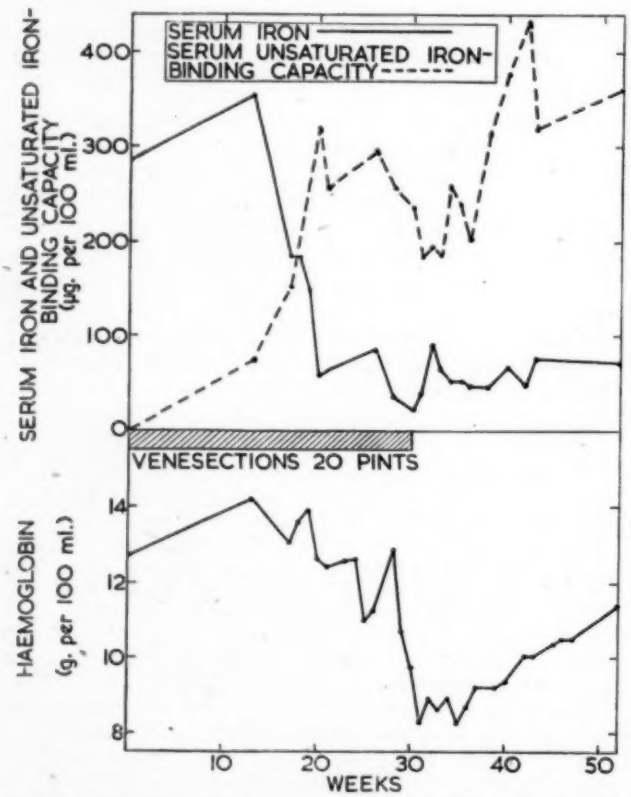

FIG. 1.—Serum iron, serum unsaturated iron-binding capacity, and haemoglobin estimations from April, 1953, to March, 1954.

In the second series of venesections 20 pints (11 litres) of blood were removed. After 10 pints (5.5 litres) of blood had been withdrawn the serum iron began to fall and did so progressively until in October, 1953, the lowest figure of 22 μg. per 100 ml. was recorded. The haemoglobin, which was 12.7 g. per 100 ml. at the start of the second series of venesections, fell slightly, but it was not until October, 1953, that the haemoglobin suddenly dropped to 8.2 g. per 100 ml., the anaemia being hypochromic normocytic in type. At this time the patient became increasingly dyspnoeic and was admitted to hospital for a short period. The venesections were discontinued, but the serum iron remained at an abnormally low level and the haemoglobin showed only a slow increase to 11.5 g. per 100 ml.

From the start of the second series of venesections in April, 1953, the patient began to feel better in himself and was less tired. In October he resumed work for the first time for nine months in spite of the shortness of breath consequent upon the development of anaemia. The shortness of breath has since gradually improved, and at the time of writing he stated that although he was still troubled by abdominal pain he felt better than at any time since he first became ill. On examination the pigmentation of the face and neck was noticeably less and that of the forearms had almost disappeared. The liver was palpable 4½ in. (11.4 cm.) below the right costal margin, but was much less tender, and no free fluid could be detected in the abdomen. The abdominal girth was 39 in. (99 cm.), as compared with 44 in. (112 cm.) in 1950. The glycosuria, which was present in 1950, was not found on any subsequent occasion.

Discussion

A fall in serum iron and the development of a severe anaemia as the result of the treatment of haemochromatosis by repeated venesection has not previously been recorded. Under normal conditions the serum iron reflects the level of iron available for haemoglobin synthesis (Granick, 1949) and the combination of low serum iron and high unsaturated iron-binding capacity is characteristic of iron-deficiency anaemia (Rath and Finch, 1949). The pronounced fall in serum iron preceding the development of a severe anaemia therefore suggests a progressive depletion followed by complete exhaustion of the iron available for haemoglobin synthesis.

It is, however, unlikely that the 15 g. of iron removed represents the total iron stores of the body, as this has been estimated to be between 25 and 50 g. in haemochromatosis as compared with 3–5 g. in the normal person (Sheldon, 1935). It is possible that in the present case some of the iron may have been deposited in the form of very large aggregates of haemosiderin that are only slowly mobilized, especially if they have been deposited extracellularly or in such amounts as to interfere with cell function, as suggested by C. A. Finch *et al.* (1950). In other cases of haemochromatosis treated by venesection similar amounts of iron have been removed without the development of significant anaemia, and in the cases reported by Davis and Arrowsmith (1953) serial biopsies have shown pronounced diminution, and in one case almost complete disappearance of iron from the liver. These authors also quote one patient in whom 103 litres of blood, equivalent to 52 g. of iron, were removed without untoward effect.

The persistence of the anaemia raised the problem of whether iron should be given in an attempt to increase the rate of blood regeneration. It was expected that on discontinuing venesections the absorption of iron from the diet would lead to an increase in haemoglobin concentration at least as rapid as that occurring in a successfully treated iron-deficiency anaemia, and that it would be followed, as the iron stores were replaced, by an increase in the serum iron. The haemoglobin, however, showed only a very slow increase, and the serum iron remained consistently low. The possibility of a defect in absorption therefore had to be considered. An oral-iron-absorption test showed adequate absorption of a 45-gr. (3-g.) dose of ferric ammonium

citrate (Fig. 2), and it was concluded that the persistence of the anaemia was due to the deficiency of iron in the diet. It was nevertheless decided to refrain from giving additional iron on the grounds that the patient was not unduly disturbed by the anaemia and that the administration of iron seemed a contradiction of the previous treatment.

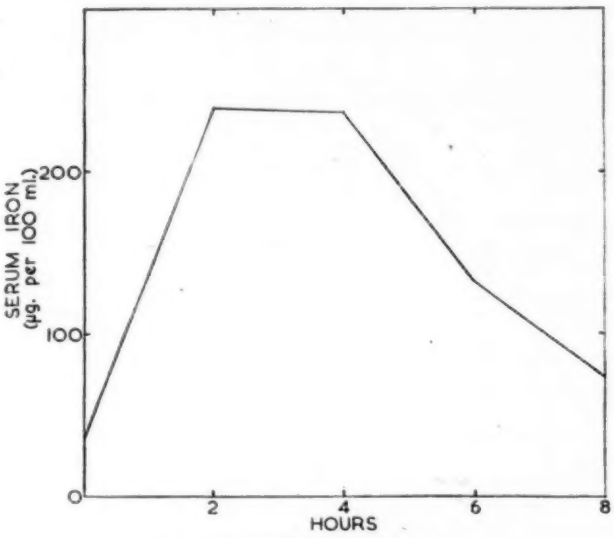

FIG. 2.—Oral-iron-absorption test.

The important question of the relationship between the accumulation of excess iron in the tissues and the development of haemochromatosis has not been fully elucidated (Althausen *et al.*, 1951). It has not been demonstrated that the accumulation of iron in the form of ferritin and haemosiderin by itself will bring about cell destruction with consequent fibrosis, and it is probable that the process by which iron is deposited in haemochromatosis is a physiological one. The suggestion has therefore been made that it is the iron that cannot be converted into ferritin, either because of too rapid deposition or because the tissues are already saturated, which brings about cell destruction either by the precipitation of proteins or by the inactivation of specific enzymes (Granick, 1949). This is in accord with the observations of Bothwell *et al.* (1952), who investigated two patients, one a male and one female, both of whom were in their early twenties and had severe heart failure. Radio-iron-absorption studies showed an increase of absorption of iron in these patients as compared with four other subjects with haemochromatosis, who themselves had uptakes greater than normal. The disease appeared to be in a more acute form in the two younger patients and the damage to the myocardium to be related to the rate of deposition of iron rather than to the actual amount of iron which was being laid down. The possible effect of venesection may therefore depend not so much on the quantity of iron removed as upon the stage the disease has reached by the time treatment is begun.

Owing to the rarity of haemochromatosis the number of patients so far treated is small, and any assessment is necessarily tentative and incomplete. Houston (1953) and Warthin *et al.* (1953) reported individual cases, the latter's showing considerable improvement, and in our own case definite subjective and objective improvement was noted. Davis and Arrowsmith (1953) have collected 30 cases treated by venesection, with details of 15, of whom 12 are reported as showing a satisfactory response to prolonged repeated bleeding. In a series of the patients personally seen by Davis and Arrowsmith since 1945, six were adjudged to be suitable for bleeding and four were excluded because of carcinoma of the liver, carcinoma of the prostate, and severe anaemia. Of the six patients treated by venesection one has died, four have had favourable responses, including two who showed striking improvement, and one, treated cautiously because of congestive heart failure, has had treatment too recently for evaluation. Thus, though some of the results achieved are encouraging, it appears that treatment by repeated venesection is limited to a selected group of cases. In addition, Davis and Arrowsmith have pointed out the burden of repeated venesection, which is such as to make it difficult or impossible to persuade some patients to undertake or continue treatment. This difficulty did not arise in our patient, who was very co-operative throughout the whole period of venesection.

The assessment of venesection in terms of prognosis and its eventual place in the treatment of haemochromatosis will require prolonged and careful observation. Since Sheldon's (1935) estimate of 18 months as the average duration of life from the diagnosis of haemochromatosis, considerable advances have been made in the treatment of diabetes and cirrhosis of the liver, with consequent improvement in prognosis. Marble and Bailey (1951), for example, found the average duration of diabetes in 30 cases of haemochromatosis recognized since 1922 to be 4.9 years, and the duration of diabetes in three living cases, with an average age of 64, to be 9.2 years. At the same time it must be remembered that other complications such as cardiac failure and primary carcinoma of the liver, the incidence of which is very much greater in haemochromatosis than in cirrhosis of the liver (Warren and Drake, 1951), may well become more apparent as age increases. The age of the patient and the duration of the disease before starting treatment may, moreover, be found to be important factors determining the prognosis and the effectiveness of venesection.

Since the advent of the diagnosis of haemochromatosis by liver biopsy and serum-iron estimations, it has become possible to make a diagnosis before the full clinical picture of pigmentation, diabetes mellitus, and cirrhosis of the liver has developed. It has, as a consequence, been advocated that the disease should be recognized as early as possible—for example, on a single finding such as hepatomegaly (Feder *et al.*, 1950)—and that treatment should be started before irreversible changes have occurred. Whether this will materially alter the prognosis or the effectiveness of venesection is not known. From the reports so far published, it seems established that some patients do show initial improvement as the result of treatment by repeated venesection, and the impression has been gained that patients are permanently benefited and their lives prolonged.

Summary

A case of haemochromatosis treated by repeated venesection is reported. A total of 55 pints (31 litres) of blood was removed over the course of two years. At the end of this time a severe anaemia developed which is believed to have been due to exhaustion of available iron stores.

Some subjective and objective improvement has taken place in spite of anaemia, and the published reports suggest that venesection is an effective means of treating selected patients with haemochromatosis.

ADDENDUM.—When the patient reported on above was last seen on November 9, 1954, his haemoglobin was 15 g. per 100 ml., serum iron 156 μg. per 100 ml., and unsaturated serum iron-binding capacity 331 μg. per 100 ml. His only complaint was of aches and pains in the joints, and his physical signs remained unchanged.

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PURE RED-CELL ANAEMIA IN PATIENTS WITH THYMIC TUMOURS*

BY

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Selective bone-marrow aplasia involving erythropoiesis and leaving leucocyte and platelet production unaffected is most uncommon, being referred to by Whitby and Britton (1953) as a rare curiosity and mainly of theoretical interest. This disorder was first described by Kaznelson (1922), who called it erythrophthisis. Reports of the condition occurring both in children and in adults are now more frequently seen, and long-term studies are being made (Diamond, 1954).

The cause of this type of anaemia remains unknown. A congenital origin, ABO blood-group incompatibility between mother and affected child, allergy, riboflavine deficiency, toxins, and "hypersplenism" have all been suggested as possible explanations by various writers, and there may be a mixed aetiology underlying the unusual bone-marrow change leading to "pure red-cell anaemia," the term first used by Lescher and Hubble (1932).

A syndrome of selective erythroblastic aplasia in association with the presence of a thymic tumour has been observed in a proportion of the small number of adult cases which have been fully investigated. Davidsohn (1941) recorded the case of an adult woman with severe anaemia due to erythroid hypoplasia who was found at necropsy to have a lympho-epithelioma of the thymus. The case reported by Humphreys and Southworth (1945) and that of Chediak *et al.* (1953) both showed prompt haematological improvement after removal of thymomas. Ross *et al.* (1954), with whom we have had exchange of information for some time, record two cases showing the simultaneous occurrence of benign thymoma and refractory anaemia very comparable to those described in this paper. Removal of thymoma in both of their cases—and also splenectomy in one of them—was not followed by any haematological improvements.

This preliminary report gives abridged case histories of two adult patients with pure red-cell anaemia. One of them also had myasthenia gravis. Both had thymomas and were subjected to thymectomy, splenectomy, and A.C.T.H. therapy, with ultimate recovery. Further details, discussion, and follow-up studies will be published elsewhere.

*A description of these cases was given by Dr. Chalmers at the Fifth International Congress of Haematology, held in Paris in September, 1954.

Case 1

An electric-train driver aged 48 was transferred from the National Hospital for Nervous Diseases on June 28, 1951, for investigation of severe anaemia. Weariness, dyspnoea, and palpitation had increased progressively for a month. Dr. Denis Williams had some eighteen months previously diagnosed myasthenia gravis and the patient had been treated with oral neostigmine, belladonna, and ephedrine with excellent clinical effect. His history disclosed no apparent cause for the anaemia. He had been married for twenty-five years and had a family of three. For about six years there had been gradual loss of libido.

On examination he was a cheerful, heavily built, thick-set man—height 5 ft. 9 in. (175 cm.); weight 12½ st. (79 kg.)—showing marked pallor of the skin and mucous membranes. The heart rate was 80 and regular, there being a systolic murmur over the praecordium. His B.P. was 130/60. Clinical examination of lungs and nervous system was negative, myasthenia being controlled with neostigmine. The tongue was normal and no abdominal mass or palpable enlargement of liver or spleen was present.

Investigations and Progress

Blood examination showed severe normochromic anaemia with red cells varying little in size and shape and showing no polychromasia: Hb, 27% (4 g.); red cells, 1,340,000 per c.mm.; C.I., 1; P.C.V., 11.5%; M.C.V. 85 cubic μ; M.C.H.C., 35%; white cells, 5,200 (polymorph neutrophils 49%, lymphocytes 47%, monocytes 4%, eosinophils nil); platelets 325,000 per c.mm. No reticulocytes or nucleated red cells could be found on repeated examination. Blood group: A, Rh (D) positive, direct Coombs test negative, bilirubin less than 0.5 mg. per 100 ml.; blood urea, 21 mg. per 100 ml.; thymol turbidity, 1.2 units; alkaline phosphatase, 3.4 King–Armstrong units; serum proteins, 6.9% (albumin 3.4 g.%, globulin 3.5 g.%; A.G. ratio 1:1); normal red-cell fragility, bleeding-time, clotting-time, and clot retraction. Wassermann reaction and Kahn test were negative. An alcohol histamine test meal showed no free hydrochloric acid in the gastric juice, but retesting later showed free acid to be present. The urine was normal and contained no excess urobilinogen.

Smears of sternal marrow showed average cellularity with a striking absence of all forms of erythroblasts. Only a very occasional equivocal red-cell precursor could be found, but a large number of small densely staining cells with little or no cytoplasm were seen. These were regarded as probably of lymphoid type. A slight increase in plasma and reticulum cells was observed. Myeloid series and megakaryocytes seemed of normal morphology and distribution.

Transfusion of concentrated red cells derived from approximately 2,000 ml. of citrated blood gave benefit. The blood count figures rose to Hb 46% (6.8 g.), red cells to 2,000,000, and P.C.V. to 18%. No reticulocytes could be found.

While tomography was not performed in this case, there was no good evidence of mediastinal tumour on the plain *x*-ray film of the chest. Treatment for myasthenia gravis with oral neostigmine, 15 mg. q.d.s., together with belladonna and ephedrine, was continued. No haematological benefit was obtained from prolonged treatment with various haematinics. A course of intramuscular A.C.T.H. (1,425 mg. over two weeks) also caused no change in the marrow or blood findings, reticulocytes being consistently absent. Repeated blood transfusions seemed the only means of keeping the patient alive.

After reading the remarkable case recorded by Humphreys and Southworth (1945), in which removal of a tumour of probable thymic origin appeared to have a direct influence on pure red-cell anaemia, we were led to consider this operation for our patient. It was also possible that this

procedure would benefit his myasthenia gravis, though no conclusive *x*-ray evidence was present to suggest thymic enlargement. After repeated preliminary transfusions, together with pre-operative increase of neostigmine dosage, Mr. A. H. M. Siddons performed exploratory thoracotomy on October 23. A lobular thymoma of 120 g. weight and 10 by 9.5 by 3 cm. in size was successfully removed. Though it was adherent to the left pleura, there was no evidence of the tumour invading other surrounding structures, and the histology was that of a thymoma of lympho-epitheliomatous type. Ten days after the operation reticulocytes were found in the patient's blood for the first time since he had come under our observation. They reached a maximum of 19.5% eighteen days after thymectomy (see Fig. 1). The patient showed obvious clinical improvement and there was spontaneous gain in haemoglobin, red-cell count, and P.C.V. Puncture of the right iliac crest two weeks after operation showed fairly frequent erythroblasts at all stages of normoblastic development. Six weeks after thymectomy, neostigmine, which had been gradually reduced in dosage after the operation, was discontinued without evidence of myasthenic relapse. In contrast, haematological improvement was not maintained, and seven weeks after thymectomy the blood count was falling, reticulocytes were again absent, and marrow examination (right iliac crest) showed a virtual absence of erythroblasts.

Folic acid, liver, multivitamin tablets, nicotinamide, and cobalt chloride (the latter causing nausea and being given for only a short time) were all ineffective. Repeated transfusions were again necessary. No return of myasthenic symptoms was observed, but haematologically the prognosis seemed grave.

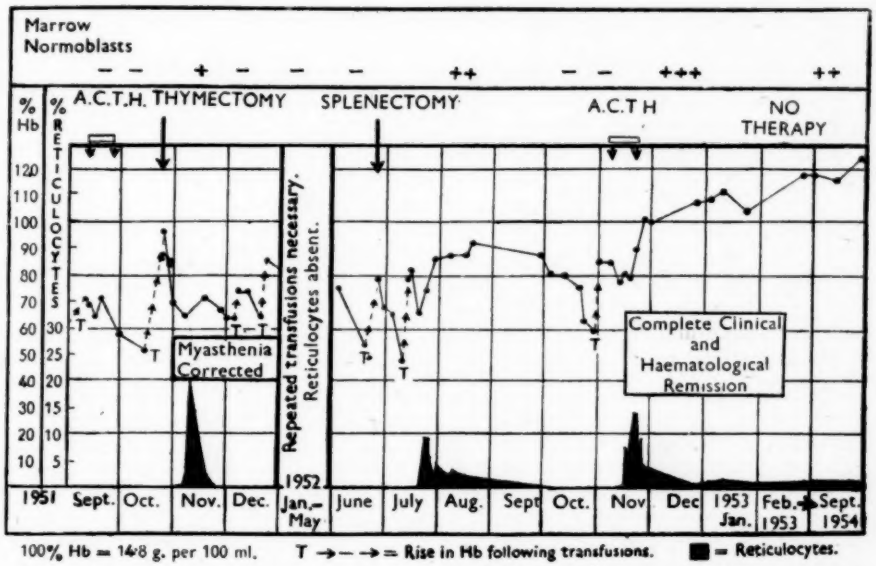
Marrow Normoblasts
− − + − − − ++ − − +++ ++
% Hb
% RETICULOCYTES
A.C.T.H.
THYMECTOMY
SPLENECTOMY
A.C.T H
NO THERAPY
Myasthenia Corrected
Repeated transfusions necessary. Reticulocytes absent.
Complete Clinical and Haematological Remission
1951 Sept. Oct. Nov. Dec. 1952 Jan.–May June July Aug. Sept Oct. Nov Dec 1953 Jan. Feb.–1953 Sept. 1954
100% Hb = 14·8 g. per 100 ml.
T →– –→ = Rise in Hb following transfusions.
= Reticulocytes.

FIG. 1.—Case 1. Pure red-cell anaemia in a patient with myasthenia gravis and thymoma. Haematological and therapeutic data over a period of three years.

On the slender hypothesis that removal of lympho-epithelial thymic tissue had in some way been related to the temporary benefit, and considering that hypersplenism might be a mechanism associated with the anaemia, splenectomy was advised, the operation being performed by Mr. Ralph Marnham on June 24, 1952. Marrow examination at the time of operation showed no erythroblasts but was otherwise normal. The excised spleen weighed 400 g. and was dark and firm. Apart from the prominence of the Malpighian bodies and considerable haemosiderosis, no noteworthy histological features were reported. The patient's post-operative clinical course was stormy for about three weeks. The haemoglobin, the number of red cells, and the P.C.V. again fell after the pre-operative transfusions, and further folic acid and transfusions of concentrated cells were given, together with antibiotic therapy. No reticulocytes were observed on frequent examination until a month after the operation. They then showed an increase up to 9.5% together with a reappearance of marrow erythroblasts and an associated increase in the blood values, which reached Hb 93% (13.8 g.), red cells 4,370,000, and P.C.V. 44% on August 18 (eight weeks after splenectomy), when he was discharged from hospital looking and feeling well. No form of therapy had been given for a month.

The patient was kept under observation, and haematological relapse again occurred in four weeks. No improvement took place with intensive folic acid therapy, and as the marrow again showed absence of erythroblasts, and there were no reticulocytes in the blood, further blood transfusions had to be given. On November 5 a course of A.C.T.H. therapy was started. A daily dosage of 40 mg. increasing to 200 mg. was given intramuscularly in divided doses every six hours. On the sixth day of A.C.T.H. therapy—by which time 800 mg. had been given—reticulocytes appeared in the blood, and by the sixteenth day of treatment a reticulocyte peak of 14% was reached. There was an associated rise in haemoglobin, red cells, and P.C.V., together with remarkable clinical improvement. A.C.T.H. was discontinued after seventeen days, when a total of 2.59 g. had been given. At this stage the haemoglobin had risen to 90% (13.3 g.), red cells to 4,230,000 and P.C.V. to 43%. It was observed that, in addition to reticulocytosis during A.C.T.H. therapy, fairly frequent normoblasts and red cells containing Howell–Jolly and siderotic bodies were noted in blood films. Bone-marrow examination showed active normoblastic erythropoiesis.

The gratifying response obtained during A.C.T.H. therapy in October, 1952, has been followed by complete and maintained haematological remission for two years *without any further treatment being necessary*. Moreover, no recurrence of myasthenia gravis has occurred since removal of the thymic tumour. The patient's only complaints are chronic bronchitis and loss of libido.

Case 2

A widow aged 62 was admitted for investigation of refractory normochromic anaemia on December 11, 1952 (Fig. 2). She had suffered from weakness and breathlessness for about six months. There was nothing in her history to account for the anaemia. Treatment at another hospital with liver extracts, vitamin B_{12}, iron, and multivitamin preparations was ineffective. She had received six blood transfusions between August and December, 1952. She had had three normal pregnancies. Menstruation had ceased at the age of 55. Her previous health had always been good apart from bronchitis in 1932, when she attended the Brompton Hospital.

On examination she was found to be a pale, well-nourished, afebrile woman with no physical sign of disease apart from pallor and slight oedema of the ankles and over the sacrum. Her weight was 10 st. 4 lb. (65.3 kg.). B.P. was 160/90. Her urine was normal, containing no excess urobilinogen. A test meal showed the presence of free hydrochloric acid.

Haematological Investigations

Hb, 48% (7.1 g.), red cells, 2,100,000 per c.mm.; P.C.V., 18%, M.C.V., 90 cubic μ; M.C.H.C., 38%; E.S.R., 50 mm. in one hour (Wintrobe); direct Coombs test negative; blood group O Rh-negative (cde/cde). No abnormal antibodies were found in serum. No reticulocytes could be found on

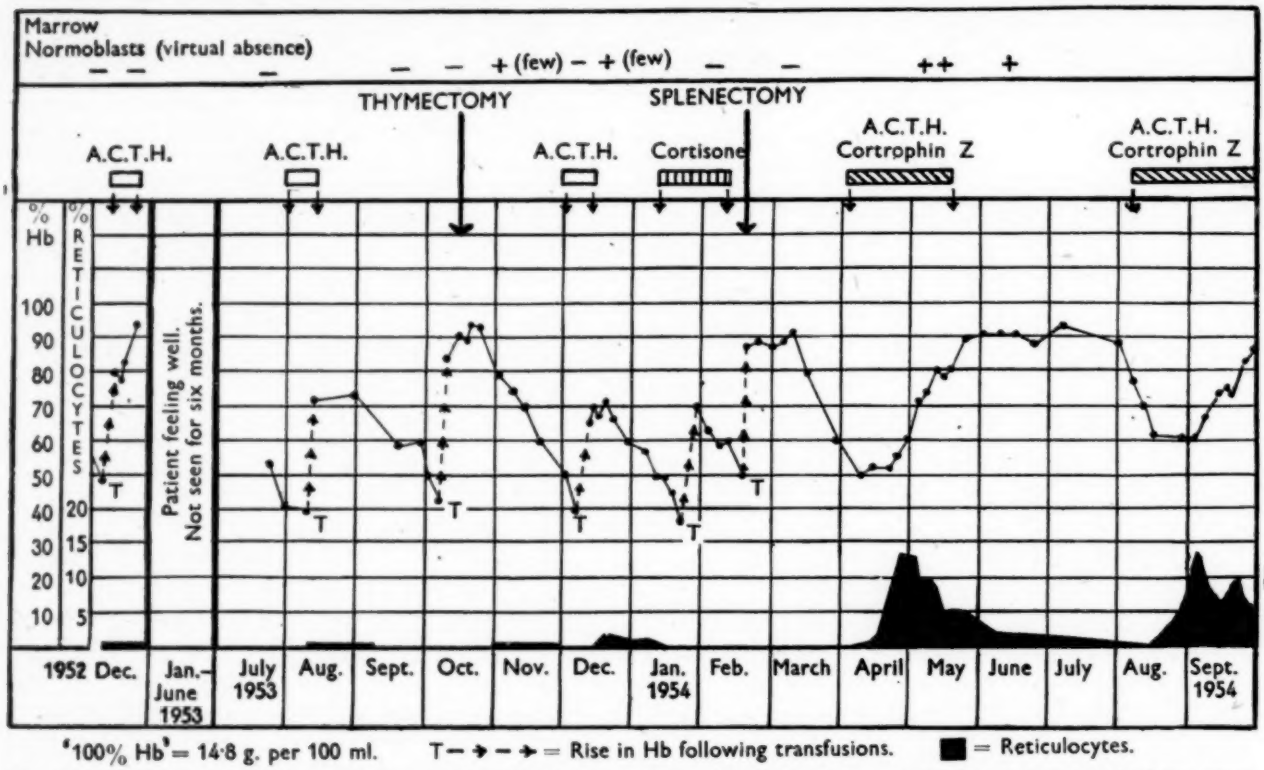

FIG. 2.—Case 2. Pure red-cell anaemia in a patient with thymoma. Haematological and therapeutic data over a period of two years.

prolonged examination. The white cells numbered 8,500 per c.mm. (polymorphs 41%, lymphocytes 46%, monocytes 9%, eosinophils 4%); platelets 260,000 per c.mm. Smears of sternal marrow showed a severe depression of erythropoiesis, only a very occasional late normoblast being seen. Numerous small dark "lymphoid" cells, as observed in Case 1, were present. Apart from a slight increase in plasma cells and eosinophils no abnormalities in the white-cell series were observed. Megakaryocytes were numerous and of normal morphology. Bilirubin, 0.3 mg. per 100 ml. Alkaline phosphatase, 9 King–Armstrong units. Plasma protein and liver function tests were normal. Wassermann and Kahn reactions were negative. Repeated counts showed an occasional reticulocyte, but they were always under 0.1% and often were not demonstrable.

Slow transfusions with 1,600 ml. of concentrated group O Rh-negative (cde/cde) cells raised the blood values to Hb, 79% (11.7 g.); red cells 4,360,000; P.C.V., 37%. A course of A.C.T.H. was started on December 14, a total of 1.25 g. being given by intramuscular injection over nine days. The patient was most anxious to get home, and she left hospital on December 23 much improved and before the chest could be *x*-rayed. While very occasional reticulocytes could be found they remained under 1%, and a repeat sternal bone-marrow examination following the A.C.T.H. therapy showed no significant change, erythroblasts being very scanty. On discharge, Hb was 94% (13.9 g.), R.B.C. 4,610,000; P.C.V., 38%; W.B.C., 15,700.

The patient felt well for the next six months, but when seen on July 25, 1953, she complained of tiredness. Hb had fallen to 54% (8 g.), with R.B.C. 2,320,000; C.I. 1.2; P.C.V., 21%; M.C.V., 91 cubic μ; W.B.C., 7,800. Marrow puncture showed absence of erythroblasts and a moderate increase of eosinophilic granulocytes. *X*-ray examination of the chest showed a large oval mass in the mediastinum measuring about 4 by 5 in. (10 by 12.5 cm.) and lying in the anterior mediastinum in front of the heart.

This finding, when considered in relation to Case 1, made us wonder whether the patient also had a thymoma in association with her unusual anaemia. She, in contrast, never had suffered from any symptoms suggestive of myasthenia gravis. We were able to find out that she had attended the Brompton Hospital in 1932 and a mediastinal shadow had been observed at that time, long before she had any symptoms of anaemia. A further course of 1.25 g. of A.C.T.H. was given over ten days (comparable to that given seven months before). While no reticulocytes could be found during the course of A.C.T.H. therapy, during the subsequent three weeks they reached 1%, and even occasional normoblasts could also be found in the blood. Improvement was very transient, however, and repeated marrow examination again showed virtual erythroblastic aplasia. Further blood transfusions were necessary.

In view of the possible connexion between the anaemia and the mediastinal mass, which we thought might well be a thymoma, thoracotomy was performed by Mr. A. H. M. Siddons on October 15. A large lobulated tumour weighing 331 g. and 13 by 9 by 4.5 cm. in size was removed. It lay anterior to the pericardium, extending up to the origin of the great vessels, and had a small pedicle. Histological appearances were those of a thymoma with lympho-epithelial tissue divided by many fibrous septa. Convalescence was uneventful, and the patient was discharged from hospital nineteen days after removal of the tumour. Ten days after the operation reticulocytes, previously absent, appeared in small numbers, but they were always less than 1%. Marrow examination showed a few intermediate and late normoblasts, whereas none were found at the time of the operation. This change was transient, and six weeks after thymectomy the Hb was 50% (7.4 g.); R.B.C., 2,200,000; and P.C.V. 17%. No reticulocytes could be found. Erythroblasts were not observed in marrow smears. A further course of A.C.T.H. was given at this stage as well as another transfusion. Neutrophil leucocytosis occurred during A.C.T.H. therapy, as had been noted before. A.C.T.H. had to be discontinued because of pain at injection sites after 980 mg. had been given over ten days. While no reticulocytes had been found during the course of A.C.T.H. therapy they suddenly appeared two days later and rose progressively to 2.2%, associated with some clinical improvement and gain in haemoglobin, red cells, and P.C.V. Erythroblasts at this time were fairly often present in marrow smears. Once

again, however, haematological improvement was of short duration, and a month later there was again complete relapse. A course of 5.65 g. of cortisone combined with ascorbic acid, folic acid, and vitamin B_{12} was ineffective. Splenectomy was performed by Mr. Ralph Marnham on February 19, 1954, following pre-operative transfusion. On the day of operation the marrow showed complete erythroblastic aplasia. A spleen weighing 195 g. and measuring 13 by 9 by 5½ cm. was removed together with a splenunculus 1.5 cm. in diameter. Histologically no noteworthy features apart from haemosiderosis were reported.

The post-operative course was uneventful and the patient was discharged two weeks after operation. No evidence of red-cell regeneration was observed, however, and, while the platelet count rose to 500,000 per c.mm. and slight leucocytosis was observed, the haemoglobin and red cells started to fall again, and the bone marrow (right iliac crest) showed selective erythroblastic aplasia six weeks after the operation. However, in view of the effect of A.C.T.H. after splenectomy in our first case, we now considered giving similar treatment to this patient. She was apprehensive of frequent injections, and through the kindness of Dr. W. J. Tindall we were provided with a supply of "cortrophin Z," long-acting A.C.T.H. This was given at first in amounts of 40 international units daily by intramuscular injection, and the dose was gradually reduced to 20 units twice weekly. A good reticulocyte response occurred, starting on the seventh day of the A.C.T.H. course (by which time 240 units of cortrophin Z had been given), a maximum of 13.4% being reached on the twenty-fourth day of therapy. Neutrophil leucocytosis, with persistent increase of eosinophils during A.C.T.H. therapy, was also observed. Haemoglobin, red-cell count, and P.C.V. showed progressive increase, and, while the patient had fairly marked oedema in spite of limitation of fluid and salt and the regular administration of potassium citrate, she said she had not felt as well for fifteen months. Normoblasts were now frequently seen in blood films; platelets numbered 372.000 per c.mm.; and macrocytosis, polychromasia, stippling, and Howell–Jolly and siderotic bodies in the red cells were noted. When the patient had received 740 units of cortrophin Z over 48 days treatment was stopped. Marrow examination showed active normoblastic erythropoiesis at all stages of red-cell development, and blood count values continued to show maintained gain, even following discontinuation of all treatment for ten weeks, when blood examination showed Hb 88% (13 g.); R.B.C., 4,120,000; reticulocytes, 0.7%; P.C.V., 40%; E.S.R., 12 mm. in one hour (Wintrobe); M.C.V., 97 cubic μ; M.C.H.C., 32%. Persistent macrocytosis, poikilocytosis, and intra-erythrocytic dots of various types remained. Leucocytes and platelets were normal.

Within the next three weeks a fairly rapid relapse occurred —Hb, 61% (9.0 g.); R.B.C., 2,210,000; P.C.V., 26.5%; with only a very occasional reticulocyte seen. Further A.C.T.H. therapy, given as cortrophin Z, was again followed by prompt haematological improvement, and at the time of writing the patient was being maintained in good health on 40 international units of cortrophin Z twice a week.

Discussion

The association of selective erythroblastic aplasia or hypoplasia with thymic tumour has been observed, in addition to the two cases here reported, in five other adult cases that we know of (Davidsohn, 1941; Humphreys and Southworth, 1945; Chediak *et al.*, 1953; Ross *et al.*, 1954). A case with generally similar haematological findings and clinical course, and *x*-ray evidence of a large anterior mediastinal tumour, has been investigated by H. F. Brewer (1954, personal communication). She will not submit to operation, and the nature of the tumour in her case must meantime remain unknown.

Keynes (1954) in a review of the physiology of the thymus gland, made no mention of the association between anaemia and thymic tumours. Apart from those quoted above, the only references to marrow aplasia and thymic enlargement or tumour we can find are those of Opsahl (1939) and Wintrobe (1951, and personal communication). The patient mentioned by Wintrobe also had myasthenia gravis. The clinical features and types of marrow aplasia described in these cases, however, differed from those observed in ours. It would thus seem possible that a rare syndrome may exist in which pure red-cell anaemia due to selective erythroblastic aplasia or hypoplasia of the bone marrow is associated with the presence of a thymic tumour. In our Case 2 there was evidence of a mediastinal mass on *x*-ray films taken some twenty years before anaemia developed. One of the patients recorded by Ross *et al.* (1954) also showed radiological evidence of such a tumour before anaemia developed.

Two possible hypotheses have occurred to us to explain these unusual cases. Firstly, endocrine dysfunction may be the underlying cause. The thymus is known to be enlarged in some cases of thyrotoxicosis and Addison's disease. The polycythaemia seen in some cases of Cushing's syndrome might be regarded as the opposite extreme of the aplasia here described, especially as our cases latterly responded to A.C.T.H. therapy. Secondly, lymphoid proliferation in the thymus, marrow, and possibly other sites may in some way, as yet unknown, impede erythropoiesis. Depending on the degree of such interference, removal of the tumour may correct the anaemia (Humphreys and Southworth, 1945; Chediak *et al.* (1953) or, on the other hand, have no effect (Ross *et al.*, 1954). In our Case 1 temporary haematological remission occurred after removal of the thymoma, in which complete dissection was performed; but in Case 2 insignificant changes took place. This could possibly be due to some thymic tissue remaining. Splenectomy also seemed to cause temporary improvement in Case 1, as also occurred in a patient without known thymoma described by Loeb *et al.* (1953). This operation had no effect in Case 2.

While A.C.T.H., given earlier, caused no very significant haematological changes, *prompt and well-maintained responses occurred in both our cases when A.C.T.H. was given subsequent to splenectomy*. This has also been observed by Loeb *et al.* (1953) and Tsai and Levin (1954) in patients with erythroid hypoplasia but with no recorded evidence of thymoma. At the time when their reports were written their patients had not relapsed following discontinuation of cortisone or A.C.T.H., given after splenectomy.

While spontaneous recovery from pure red-cell anaemia is not unknown (Heilmeyer and Begemann, 1951; Baar, 1952) it seemed likely that the several responses obtained in our patients were related to surgery or A.C.T.H. therapy. In our second case haematological relapse following discontinuation of A.C.T.H. therapy after splenectomy, and the subsequent remission on giving further amounts of the hormone, adds force to this view. Apart from blood transfusion, all other treatment, including riboflavine, given to Case 2 (cf. Foy and Kondi, 1953) was of no avail.

More detailed discussion of these unusual cases will be made after their further study. This paper is concerned with recording the phenomena observed during the last three years and suggesting the possibility that this unusual association might be more widely recognized and investigated.

Summary

Two adult patients suffering from pure red-cell anaemia (erythroid aplasia or hypoplasia) were found to have thymic tumours.

One of the patients also suffered from myasthenia gravis. Both underwent thymectomy and splenectomy.

Haematological changes in probable relationship to such operations and the use of A.C.T.H. therapy are recorded and briefly discussed.

Both patients are at the time of writing in clinical remission. Thymectomy corrected myasthenia gravis which had been present in Case 1.

Thanks are due to Mr. A. H. M. Siddons for thymectomy; to Mr. Ralph Marnham for splenectomy, and to Professor Theodore Crawford and numerous other colleagues of the hospital and medical school staff for valuable assistance; to Dr. W. S. Killpack, of the King Edward Hospital, Ealing, for early notes and laboratory data of Case 2; and to Dr. W. J. Tindall, of Organon Laboratories Ltd., for supplies of cortrophin Z. Not least, we would again mention the patients, who submitted themselves to innumerable medical and surgical procedures with cheerfulness and optimism.

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SOME CLINICAL EPILEPTIC ODDITIES*

BY

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In any gathering of people interested in the many intriguing problems of epilepsy, I fear that the so-called oddities among patients to whom I shall refer may be regarded as somewhat commonplace. But epileptic patterns and associations are so variegated that I am encouraged to mention some cases seen in recent years and to hope that other clinicians may describe odd features of which they have experience.

Epilepsy or Migraine

The peculiar relationship of epilepsy to migraine needs no emphasis. I would, however, like to mention first some examples of how these two conditions may at times almost fuse or overlap. Occasionally a patient subject to both forms of attack may develop warning sensations which are common to each. Thus, a woman of 36 had been subject to major epileptic attacks since childhood and typical migraine in recent years. For about an hour before the epileptic attacks she would experience familiar feelings of the *déjà vu* variety, and these would be accompanied by a series of coughing attacks and often by a feeling of panic until the onset of the convulsion. Major fits were almost always preceded by a prolonged warning of this sort, but on occasion her attacks of migraine were associated with exactly similar phenomena. Blurred vision and teichopsia then occurred in addition, but consciousness was not lost.

On other occasions, without any warning, a patient may become unconscious during a severe attack of migraine and the loss of consciousness then generally resembles a brief akinetic epileptic attack. For instance, a girl aged 19 has characteristic attacks of migraine, as does her father. She says that, on occasion, when her headache is severe, her hands begin to tingle and feel enlarged, her limbs feel stiff, and she falls down in a brief attack of unconsciousness. She has never had any sort of faint or fall on any other occasion.

Another patient who suffers from migraine and who has a family history of epilepsy, describes similar attacks of unconsciousness at the height of a severe sick headache. She says that she falls down suddenly and may be picked up unconscious in the street, having hurt herself. She recovers consciousness after a few minutes to find that the headache has gone but she feels confused and drowsy.

Sometimes migraine is associated with attacks that seem more cataplectic than epileptic. Thus a man of 68, who has had migraine since childhood, began at the age of about 35 to fall down in some of his bouts of migraine. On such occasions he has a severe right-sided headache and suddenly falls forwards on to his knees. He says that he is not giddy and remains aware of his surroundings, but feels that he has to stay immobile for 15 to 30 seconds. He then stands up without difficulty, feels sick, and vomits shortly afterwards. He has never fallen on to his knees in this way except in association with a sick headache.

Inhibitory epilepsy, taking the form of transient hemiplegia, has its counterpart in hemiplegic migraine. The epileptic variety is usually an isolated event, whereas the migrainous type is usually associated with visual disturbances and followed by sick headache. Sometimes, however, it may be difficult to distinguish the one from the other. Thus, a man of 46, who has for some years been subject to classical migraine, recently had a sudden attack of loss of power of the right arm and leg without any associated sensory symptoms or subsequent headache or nausea. There was no impairment of consciousness, and the power returned suddenly, after about five minutes. He had an exactly similar attack later the same day. When seen next day there were no abnormal neurological signs and his blood pressure was normal. There is little in the attack itself to signify whether in this case it was a migrainous variant or an isolated inhibitory epileptic seizure.

Initial loss of sight (hemianopic or total) may form an inhibitory aura in both epilepsy and migraine, but, like the transient hemiplegia just mentioned, temporary blindness may occur as an isolated phenomenon. I have recently seen a female patient aged 27 who is subject to both epilepsy and migraine. These attacks are not preceded by visual loss, but on four occasions lately she has experienced isolated episodes of sudden and complete loss of vision. These are unassociated with headache or loss of consciousness and they have varied in duration from ten minutes to five hours.

Apart from migraine, there are some other conditions which, although usually independent, may be associated with epilepsy. An odd case of the almost coincident onset of sleep paralysis and epilepsy was as follows. A woman aged 30 woke up in the early morning, lying flat on her back and quite unable to move or speak for several minutes. She was frightened, but was fully aware of her surroundings; there had been no tongue-biting or incontinence, and her husband, who was with her, had not been disturbed. She had never experienced anything like this before, and her account is most suggestive of sleep paralysis. Next day she felt quite well, but late in the morning, while looking at a book, she suddenly felt far away, gave a cry, and had a major epileptic attack in which she bit her tongue and was incontinent. She had never had any sort of fit or faint before, and there were no obvious physical or emotional factors which might have influenced the onset in rapid succession of these two different forms of attack.

*A paper read at a meeting of the International League against Epilepsy (British Branch) at the National Hospital, Queen Square, on March 12, 1954.

Clonic and Tonic Components

The relationship between nocturnal myoclonus and epilepsy has recently been emphasized by Sir Charles Symonds, and many epileptics are familiar with "the jumps." I would mention here a man of 22 who had had three major epileptic attacks and was also subject to myoclonic jerks. The point of interest was that fluid retention seemed to increase his liability to both fits and jerks. One of the fits had occurred after drinking a good deal of beer the previous night, and he had also noticed that myoclonic jerks occurred especially after beer-drinking.

Myoclonic jerks may precede an ordinary grand mal attack, and they may be the only positive motor component. For instance, a man of 30 has attacks in which there is a preliminary warning-feeling of depression and lassitude for about 24 hours. He then develops generalized myoclonic jerking of all the limbs. These continue for about ten minutes, during which time he is fully conscious and able to converse normally. He then suddenly loses consciousness and the jerking ceases. He remains limp and unconscious for a period varying from ten minutes to one hour.

Another patient, a woman of 30, has for some ten years been subject to very brief generalized myoclonic attacks, associated with momentary loss of awareness and sometimes incontinence of urine. These attacks are most likely to occur at menstruation or on first waking in the morning. She never falls down in an attack and sometimes the myoclonic jerks are unaccompanied by any impairment of consciousness. During the war both her shoulders were dislocated in an air raid, and in the next few years she spontaneously redislocated one or other shoulder about 20 times during myoclonic attacks.

In other cases of idiopathic epilepsy the motor component of the fit is confined to tonic contraction, and here again consciousness may be retained throughout the ictus. I have recently seen a man of 30 who has attacks of this sort. When he was 5 or 6 years old he began to have convulsive attacks, but, later, petit mal only. Now he has purely tonic attacks about three times a month. He generally gets a warning of a "fluttering feeling in the stomach, rising up to the throat"; his arms and legs then shoot out stiffly and he falls down. The onset is very sudden, and once he fractured some ribs in falling. There are no convulsive movements and there is no tongue-biting or incontinence. He is unable to talk, but says that he remains fully aware of his surroundings. After 10 to 15 seconds his muscles relax, he stands up, and he feels well.

A schoolboy of 14 gets similar tonic attacks in which he is said to extend his left leg and arm; but these attacks may be succeeded by convulsions and unconsciousness. On one occasion, however, he had a limited attack at school, and as his leg shot out he tripped up the teacher, who promptly caned him. He has also received regular phenobarbitone and phenytoin, and is now almost free from attacks.

Some Reflex Mechanisms

The onset of fits is often associated with odd circumstances. Reflex forms of epilepsy such as the acousticomotor and musicogenic varieties are well known. Certain types of music are specially apt to precipitate attacks in susceptible subjects, and organ music seems to be particularly potent. One of my patients has several times been carried out of churches and cinemas on this account. He found that he was upset by hearing organs played over the radio, especially when a tremolo or vox humana stop was used. A certain organist's signature tune was particularly obnoxious to him, and on hearing it he would develop a horrible sensation in the stomach, with numbness and tingling which proceeded usually to a major epileptic fit.

Photic stimulation of attacks, well known to electroencephalographers, may also occur under natural conditions. Apart, however, from the effect of flicker, exposure to a constant dazzling light may play a part in evoking a seizure, and, for what it is worth, I have on two or three occasions met epileptics who had had a major attack when using whitewash or white paint on the outside of a house or wall in very bright sunlight.

Overbreathing

Another mechanism which is regularly employed in electroencephalography to induce dysrhythmia may be observed sometimes under natural conditions. I refer to overbreathing, which is well known to induce unconsciousness or petit mal in susceptible subjects. The importance of this was recognized in the R.A.F. during the war. Dr. Denis Williams, in an investigation into causes of unconsciousness, confusion, or amnesia amongst aircrew while flying, concluded that an epileptic fit was probably responsible in a third of the cases. Moreover, he found that the most frequent indirect method by which these epileptic attacks arose was by the hyperventilation which accompanied severe emotional tension.

More peaceful examples of spontaneous overbreathing producing attacks, generally petit mal, are not uncommon amongst young people. I recently saw a boy of 16 who had had typical petit mal for three years. He said that about half of his recent attacks had been related to such incidents as walking fast, playing table tennis, or running to field a boundary at cricket. It was confirmed during E.E.G. recordings that, when he overbreathed, he developed clinical petit mal attacks, and these were associated with prolonged 3-per-second wave-and-spike outbursts.

Another patient, subject to petit mal, told me that when he was aged about 17 he won six races at school in the same day. They were all at short distances, and after each of them he had a petit mal attack.

A girl of 17, subject to occasional epileptic attacks, had been galloping on horseback. She pulled up, rather breathless, had a sinking feeling, dismounted, and fell in a limp state of unconsciousness for a few seconds. She said that on a previous occasion she had had a momentary attack of unawareness while galloping. She was advised to stop horse-riding, but later reported that the same thing had occurred when she had climbed Ben Lomond and was near the summit and out of breath.

A final example of the effect of overbreathing is that of a small girl, liable to petit mal, who has been seen to have attacks after blowing up toy balloons.

Micturition or Pain

On several occasions I have noticed that patients have reported having had epileptic attacks during voluntary micturition, usually when they have got up in the night. For instance, in 1950, I saw a man of 33 who in the previous five years had had four times fallen unconscious. On all but the last occasion he had just woken up or was feeling sleepy and had gone to pass water. There was no discomfort or warning of an attack, and he always remembered the beginning of micturition. He would then suddenly fall down limply and remain unconscious for half an hour or more.

Other patients have given similar accounts of falling unconscious when passing water, but, as this has always been after a nap or on getting up in the night, it may be that the physical process of micturition is less significant than the sleepy, newly awakened state in which it has occurred.

On rare occasions pain is encountered as an epileptic aura. I recently saw an epileptic woman who had severe abdominal cramp in the night and, on getting out of bed, fell unconscious. When she regained consciousness some minutes later the pain had gone. Some examples of this sort, however, are perhaps only exaggerations of the more usual types of visceral aura.

Another woman, aged 45, was referred to me on account of brief attacks of rectal pain which had occurred at irregular intervals and with increasing frequency for some 20 years. No local cause had been discovered. On questioning her, it soon became clear that many of the attacks of pain were followed by brief loss of consciousness and

that the rectal pain was in fact an epileptic aura. There were no abnormal neurological signs. She said that she did not feel faint from the pain itself, which was rarely severe, but she would become unaware of her surroundings for a few seconds or minutes. On recovering her senses there was no longer any pain. Her husband said that she looked pale and her eyes were open and staring during the attacks. She had never fallen, though she had been incontinent of urine in one attack. She had previously been subject to migraine but the epilepsy had never been recognized.

Preliminary Motor Phenomena

I will not refer to the strange and sometimes complex sensory auras which sometimes herald the onset of a fit, but I should like to mention some of the preliminary motor phenomena. It is well known that many epileptics are restless and irritable for some hours before an attack, and they can sometimes ward it off by keeping on the move. In some cases involuntary coughing is the first evidence of an attack, and I have already mentioned a woman whose major epileptic attacks were preceded by a series of coughing attacks, associated with sensations of *déjà vu* and sometimes panic. Another patient, a man aged 40, had had six attacks of suddenly falling unconscious. These attacks came without warning except that each was ushered in by a mild fit of coughing. It was impossible to reproduce an attack by making him cough violently or by compression of the vessels of his neck. Although the Valsalva experiment may cause fainting, there is no doubt that mild involuntary coughing attacks may be the first sign of the epileptic fit itself.

In other cases a fit may begin with spontaneous laughter. A boy aged 6 had occasional grand-mal attacks in the evening and petit-mal attacks during the daytime. The petit-mal attacks, which occurred up to three times daily, were associated with uncontrollable laughter. His mother said that he never used to laugh in this way and that he was quite unaware of his surroundings at the time. There is never any obvious cause for his laughter and he has no recollection afterwards of laughing.

Another epileptic patient, aged 20, often gives three or four piercing screams and runs several yards before falling unconscious. He says that he sometimes develops a frightening idea at these times, but is unaware of either screaming or running. Variants of this so-called cursive epilepsy consist of other sorts of automatic movement. Gowers described a patient whose fit began with his hopping round the room on one leg, and Kinnier Wilson referred to another who waved his right arm in circles before falling unconscious and convulsed. I have seen a man who often clasps his hands together three or four times before a major attack, and also a boy, subject to petit mal, who sometimes does a sort of tap-dance or automatically jumps vigorously up and down, quite unaware of his surroundings for a few seconds.

Some patients are liable to a vertiginous aura before a major attack, but on occasion the patient himself revolves. For instance, a man of 38 would often have warning of a major attack by a sudden brief sense of rotation, but on one occasion he was observed actually to rotate in space two or three times before falling to the ground unconscious. Similarly, a girl of 13, subject to major epileptic attacks for the past year, was seen to spin round before her last attack. Her mother wrote: "My daughter spun round like a top spinning, with eyes open, turned upwards—then fell on to her back unconscious."

Sequelae and Recurrence

The only comment that I will make on post-epileptic automatism concerns the odd compulsive repetition shown by some patients. Thus one middle-aged woman nearly always whispers a verse of a particular hymn, while a small boy of 4½ whom I saw some four years ago always hummed the Harry Lime theme from the film *The Third Man*.

A final point which I would mention, familiar to us all, is the liability at times of epilepsy which has long been dormant to recur unexpectedly when anticonvulsant therapy is stopped, even though this be done gradually. For instance, a young woman had had two major epileptic attacks when aged 17. She then began to take ½ gr. (32 mg.) of phenobarbitone twice daily. She continued this regularly for four years and remained completely free from attacks. She then had no phenobarbitone for one day, and on getting up the next morning she had a major attack. There was no obvious precipitating factor apart from stopping the drug. She resumed regular phenobarbitone and had had no more attacks when I last saw her some weeks later.

It may seem somewhat old-fashioned to-day to discuss this collection of purely clinical trivialities, but they are all manifestations of what Hughlings Jackson described as the "occasional, sudden, excessive, rapid, local discharges of grey matter," and the nature of these themselves is still the oddest thing about epilepsy.

MANAGEMENT OF BEHAVIOUR DISORDERS IN EPILEPTIC CHILDREN*

BY

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New methods of investigation and new anticonvulsants have greatly improved the treatment of children suffering from epilepsy. The most intractable problem remaining is that of the management of behaviour disorders complicating the picture. The following report is intended to illustrate some of the difficulties and achievements that the treatment of these cases presents, for which special sessions of the children's department of the Maudsley Hospital are set apart. The material discussed has been selected by taking those cases which at first interview presented social problems necessitating further interview with their parents. It should be stressed that this group is a highly selected one, not generally representative of epileptic children. Henderson (1953) in a survey of epileptic children of school age, found only 12% presenting problems of behaviour.

At first interview a full social, psychiatric, and medical history is taken, as in the usual working of the clinic, and all children have a routine electroencephalogram (E.E.G.) done and intelligence tests. All the findings are discussed in a conference of the two of us with registrars and the psychologist who tested the patient. Of the 50 cases to be discussed, only 8 had not been seen at some other hospital previously and 33 of them had attended other child guidance clinics or children's hospitals. Twenty-nine of the cases were admitted for further investigation and treatment. Some of these admissions were mainly for psychopathological research or for neurosurgical investigations. Most of the cases could have been dealt with on an out-patient basis only.

One must determine as completely as possible not only the character of the epileptic attacks and their

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place of origin in the brain, but also the nature of the social situation in which the child is living. The behaviour of the child is the resultant of the interaction of its own potentialities and deficits with its environment. (The exact neuropathological lesion—that is, birth injury, vascular accident, or other cause—often cannot be determined, and usually this is not important provided that it is established that surgical intervention is not possible.) There are several varieties of epilepsy in childhood, and their differentiation enables one to make a fair forecast of the child's future progress, as regards the prognosis for fits and for the type of behaviour disorder, if any, which might occur. Pond (1952) has discussed the differential diagnosis of symptoms and behaviour changes sometimes ascribed to epilepsy in children.

The Petit-Mal Child

The clearest-cut group clinically is formed by children who suffer from petit-mal attacks only. Although the attacks are sometimes first noticed after such an illness as measles, there is no evidence that they are ever caused by encephalitis or head injury. At first the attacks are often passed off as inattention, especially since they can often be brought to an end by shouting at the child. The French term "absence" well describes the brief loss of consciousness with few, if any, other changes or movements. The attacks may occur up to dozens a day, and the old concept of pyknolepsy is included in this group. One of the most valuable services done by the E.E.G. has been to delimit this type of seizure so clearly, and the term "petit mal" should be confined exclusively to brief attacks of unconsciousness associated with 3 per second spike and wave. The final diagnosis thus rests with the E.E.G., although all cases can be recognized clinically because of their characteristic total picture.

Such children nearly always have fair or ginger hair and blue eyes. In physique they are lightly built, not strong or muscular, but sometimes rather plump. The outstanding behavioural characteristics of these children are their passivity and shyness. Neurotic symptoms are found, such as nightmares and nail-biting, and the night sweats from which they suffer may also be included here. The emotional precipitation of petit-mal attacks is often clearly described by parents, and it can be demonstrated in case conferences. The attack appears to be precipitated almost instantaneously and it is not secondary to the hyperventilation sometimes produced by emotional upset. A boy aged 9 had his first petit-mal attack when his mother severely reprimanded him for attempting to light an outdoor firework in the kitchen on Guy Fawkes Day. The next one occurred with fright at a Christmas pantomime character.

The child's actual subjective experience of the petit-mal attack does not appear to be always unpleasant. A child recently referred would induce petit-mal attacks in himself by waving his fingers in front of a bright light. Bickford *et al.* (1953) have mentioned others. Because of their peaceable character these children are not a social behaviour problem, but there may be much that needs psychiatric attention because of a rather characteristic family constellation that often seems to surround them (see below). The prognosis in these children is usually good unless occasional major seizures also occur, in which case the whole clinical picture is not so clear-cut and there is much more outgoing aggression.

"Petit-mal status" is rather different and much more disturbing. For example, one boy aged 8 had periods lasting up to 10 days, when he appeared to flicker in and out of semi-consciousness every few seconds. He was incontinent and had to be spoon-fed. There were slight jerks of his limbs and flickering of his eyelids. These periods alternated with outbreaks of violent and uncontrolled behaviour, making him unmanageable at home and in an ordinary children's hospital ward. Large doses of troxidone and phenytoin brought the attacks to an end, with slow improvement in behaviour, leaving the child intellectually of the educationally subnormal level. During the confused periods the E.E.G. showed almost continuous 2 c/sec. spike and wave, similar to other reported cases.

Temporal Lobe Epilepsy

In contrast to this group are the children who at birth or later have suffered various forms of brain damage, which have resulted in epileptogenic lesions in the temporal lobes. Rarely, other lesions produce a similar picture (Falconer and Pond, 1953). The fit-pattern is very variable, as it is in adults with temporal-lobe epilepsy. Auras, usually of stomach-ache or other epigastric sensation, are common, and the fit then has a march of events with automatic movements such as chewing, together with turning of trunk or limbs to one side and autonomic changes such as flushing. Consciousness is disturbed to a variable length and depth. This march of events is one of the main differences between temporal-lobe epilepsy and true petit mal, since in the latter, even if there are slight movements such as eye-blinking, these do not progress or change to other phenomena. The child's experience of temporal-lobe attacks appears always unpleasant, and they are never self-induced, although the child may threaten this. It is also interesting that this type of attack cannot be *immediately* induced by emotional upset.

Socially these children are a difficult problem, and the majority sooner or later get excluded from ordinary schools. Their aggression is nearly always externalized in the form of violent temper tantrums, either apparently unprovoked or following the most trivial incidents of sibling rivalry or parental correction. In spite of their usually low average intelligence they have acquired a genius for annoying people. Some of the children appear to be trying to control their aggression by crude obsessional habits such as rituals of cleanliness that may be quite disabling. In general, behaviour and fits show an inverse relationship, a fact which may cause trouble during the early stages of the control of seizures. The severity of the behaviour disorders in these children again depends a great deal on the parental handling. At first sight in the clinic the behaviour disorder may overshadow the fits and appear to have such obvious psychodynamic origins that psychotherapy is attempted. The results are uniformly disheartening even if significant emotional events are ventilated or acted out.

Hill and Mitchell (1953) have noted that, in adults with temporal-lobe epilepsy, procedures such as abreaction may be actually dangerous and precipitate psychoses. Later, however, when the fits are coming under control by drugs and the general atmosphere is calmer, whether the child is at home or in hospital, then interesting and important fantasies may be produced which would appear to have been previously too threatening to the ego to become conscious.

Other Varieties of Epilepsy

The third and fourth categories in the accompanying table are separated according to their aetiology so far as present techniques allow this to be determined. From the psychiatric point of view they show various forms of disturbance and cannot be regarded as uniform groups. The variety of their reactions to emotional stresses is similar to that found in non-epileptic problem children. It is an over-simplification to say that the behaviour is the interaction of "brain damage" and a "neurotic reaction" to the social disability of having fits. Both these terms are too vague to be helpful in understanding what is going on in the child. Brain damage covers a gamut of possible neurological and psychological deficits which may need different treatments. (Hyperkinesis, which is said to be characteristic of "organic" children, is not in fact very common in epileptics.) On the psychopathological side there are great differences between the form and treatment of the passive neurotic reactions of the petit-mal child and the obsessional rituals and attention-seeking of some temporal-lobe cases.

Mental-Defective Epileptics

This is a subdivision clinically useful because in these cases the problems caused by the child's backwardness are more important than the actual fits. Among them there are two varieties that seem to be distinct enough to be mentioned. The first corresponds to that which Gibbs *et al.* (1954) have recently described as showing "hypsarhythmia." They are children in whom at a relatively early age (usually under 4 years) have suddenly developed myoclonic jerks, akinetic seizures, and a whole variety of minor and major attacks. E.E.G.s show generalized abnormalities with multiple spike-and-slow-wave complexes predominating. The condition runs a stormy course for some months, often with tantrums and behaviour disorders in between the groups of fits. Large doses of many anticonvulsants usually bring the attacks to an end, but unfortunately the children's mental development often regresses below that before the onset of fits, and subsequent development is retarded, with considerable mental defect.

The last rather unclear group consists of children who have mainly major seizures of variable length and often occurring in groups. E.E.G. studies suggest multiple epileptogenic foci, but other investigations, such as pneumoencephalogram, fail to show any specific abnormalities. They exhibit in extreme degree the slowness and stickiness that have been so often alleged to be characteristic of chronic epileptics. In interviews the slowness may reach an extreme degree to almost total mutism with rare, slow, drawling comments, which seem to be extruded with the greatest difficulty. There is often a startling contrast between the results of formal testing and interviews and what the parents insist they are sometimes capable of on good days. Socially, therefore, these children are defectives; but, in contrast to the majority of epileptic mental defectives, the degree of backwardness is not the result of severe brain damage but is related to the peculiar and so far unknown physiological effect of the seizures.

The accompanying Table shows that 22 of these 50 cases had been excluded from school. Intelligence tests showed that 20 of them were at the educationally subnormal level or were frank defectives.

Epileptic Behaviour-problem Children—Clinical Data

Clinical Group	No.	Excluded from School	Attended Previous Hospital	Educational Outcome			
				Ordinary School	M.D. or E.S.N.	Epileptic Colony	Maladjusted School
Petit mal[1]	9	2	6	7	2	0	0
Temporal lobe	8	6	8	2	1	1	2
"Organic"[2]	8	3	8	4	3	1	0
Petit mal—grand mal[3]	16	7	12	10	0	3	3
Mental defective[4] ..	9	4	8	0	7	0	2
Total ..	50	22	42	23	13	5	7

[1] Includes one case of petit-mal status.
[2] All cases with clinical evidence of brain damage and focal fits not of temporal-lobe type.
[3] All cases with generalized epileptic discharges in E.E.G. and major and/or minor seizures
[4] Includes one psychotic child who is socially and educationally defective. The rest of this group had only rare seizures of less clinical importance than the low I.Q.

Parental Reactions to the Child's Epilepsy

The extent to which the child's abnormal behaviour becomes the subject of action by doctors or schools, or even juvenile courts, depends mainly on the parental reaction to the child's total illness. Probably no illness has such a macabre folklore as epilepsy, and no epileptic child has been properly treated until some time has been spent with the parents to explain what is understood by epilepsy and to listen to what the parents think the child is suffering from, so that their fears can be allayed.

Particular parental reactions tend to be associated with the physiological varieties of epilepsy just described. For example, the petit-mal child is characteristic not only in its type of attack but also in the parental reaction. A number of the mothers of these children show an astonishing contempt for their weakly passive youngsters. They have high and rather rigid standards. They are essentially middle-class in their outlook even when financially of a different status. There is a subtle rejection of these children by the parents, and these family stresses may be so severe that the child has to be removed to an epileptic colony before treatment is successful.

On the other hand, the families with temporal-lobe disorders in their children provide the melodrama of the clinic. They exhibit to an extreme degree many of the types of broken home, foster home, institutionalization, etc., that are seen in ordinary child guidance clinic work. The low frustration tolerance of the epileptic child within this situation usually makes him the main centre of the family turmoils. Even when in-patients, such children may become the scapegoat of the group or bring upon themselves the hostility and rejection of the others.

Precisely by reason of having a physiological disability, epileptic children are almost more prone than others to become the focus of unresolved parental tensions. The unconscious hostility of one parent for another sometimes finds its expression in the rejection of a child who might resemble, in fact as well as in fantasy, unpleasant character traits of the father or mother, or his or her family. Equally, however, attempted abortion of unwanted pregnancy or hostile feelings towards the child in early life may be only too dramatically confirmed when the child develops epilepsy. How often may the divine disease seem the divine punishment for parental wrongdoing. The drugs the child receives are yet another source of anxiety, as parents are often afraid of addiction, with all the unpleasant associations that the term "drug addict" has.

Treatment

So far as details of drug treatment are concerned, there is little to add to the excellent review by Symonds (1950). It should be stressed again that phenobarbitone often produces irritability and that phenytoin may be more useful. Amphetamine is also of value in calming irritable behaviour, as has been noted by many others. Petit-mal attacks are also sometimes diminished in number. Epileptic children are extremely tolerant of drugs in general, and the ceiling of dosage should be determined by the child's individual threshold rather than any particular quantity.

Individual psychotherapy of the children has a limited place. Children with petit mal may benefit from sessions designed to give expression to the tensions that these children often have. No particular technique need be adopted in these cases differing from that used in ordinary child guidance work. A further study of the details of the psychopathology of children with petit mal is in progress.

Some estimate has been made of the amount of time given by the psychiatric social worker to the parents in these cases. Twelve cases needed ten or more interviews, for reasons related more to the emotional difficulties of the parents themselves than to the actual problem presented by the child. On the other hand, mentally defective children often posed a severe problem needing prolonged social handling. The rest of the cases required an average of about five interviews per patient.

Bidwell (1952) discussed some of the problems that are so commonly found in parents' minds. Although the contact between psychiatric social worker and parent may appear brief by some child guidance standards, considerable emotional problems are in fact dealt with in so far as they affect the epileptic child and arise from his difficulties. The process may be compared to a short-term adult analysis designed to relieve a particular set of symptoms. If the mother's personality is basically good, then the whole family situation rights itself. When, however, the epileptic child is the focus of unresolved parental and other tensions, then these may be merely transferred to other siblings. This at

least enables the epileptic child's problems to be considered on their own merits and the appropriate treatment to be successful. For example, a boy aged 6 had typical petit mal, at first treated by another hospital, where it was noted that, whereas all drugs seemed ineffectual at home, the child had attacks while an in-patient only when visited by the mother. She was an anxious woman whose husband was a chronic inadequate psychopath permanently in a mental hospital. With regular out-patient attendance of the child's mother the petit-mal attacks almost stopped on a small dose of amphetamine. The mother no longer worried about him, but problems previously denied as existing in the other children now filled her mind.

It should be stressed how important it is for the psychiatric social worker to have some working physiological knowledge as well as her psychological training. Parents are keen to understand this apparently mysterious disease, and simple explanations along the lines of abnormally excitable areas in the brain, and so on, are of great value in taking away much of the mystery that these children present to their parents.

It is still early days to speak of the effects of temporal lobectomy in the few selected cases in which it has been found possible to do the operation. The results are undoubtedly dramatic, and two or three of the most difficult cases have returned to normal as a result (one was reported by Falconer and Pond, 1953). The pitfalls in trying to deal psychotherapeutically with temporal-lobe cases have already been mentioned. It is important, however, to temper the wind to the shorn lamb after temporal lobectomy. Peaceful behaviour and freedom from fits on the ward may worsen after the child is back in his disordered home.

A boy aged 13 was the illegitimate son of a clever but unstable woman whose own mother, a doctor's widow, had had to assume responsibility for the child's welfare. He was early noted to have nystagmus and spent the first three years of his life in a home for blind babies till it was noted his sight was nearly normal. By then occasional major seizures had developed and he spent his schooldays being moved from boarding schools to colonies because of the attacks and his worsening behaviour disorder. When admitted for investigation he came with the reputation of being a liar, bad-tempered, and sexually perverse. In the ward he was a pathetic ugly duckling rejected by the other children. Tests showed him to be of near average intelligence but educationally retarded. The epileptic attacks were infrequent on regular anticonvulsants, but E.E.G. studies showed a frequently firing left inferior temporal focus. Following temporal lobectomy his behaviour improved so much that his grandmother was prepared to try him at her home. He attended the ordinary local school, and within a year was asked to join a school party going to Switzerland.

The outcome for these 50 cases so far as schooling is concerned shows that nearly one-half went back to ordinary schools, 13 were defective or attended E.S.N. schools, while only five went to epileptic colonies. Two have gone beyond school-leaving age.

These last figures clearly indicate that epileptic colonies play only a limited though valuable part in the care of epileptic behaviour-problem children. Their most important work in this respect lies in preventing the onset of severe disorders by providing a sensible and stable life for children from disturbed homes. At the present time the aim of treatment is to keep children so far as is possible at home and at ordinary schools, as Henderson (1953) has stressed. It may be regarded as a satisfactory therapeutic outcome if this can be done, even when the child is still having occasional attacks. The implication of this trend is therefore that the education of schools and parents in the handling of epileptics is of prime importance. It would be appropriate at this point to refer to the British Epilepsy Association, which is endeavouring to help the welfare of epileptics in these and many other ways. A special clinic such as this has a place in that it helps in sorting out the obscure cases and in handling the most difficult ones.

Summary

The problems of the diagnosis and management of epileptic behaviour-problem children are discussed on the basis of 50 selected cases. Full neurological and psychiatric investigations are needed for the proper application of combined medical treatment and child-guidance technique. The handling of the parental reaction and the educational placement are at least as important as the drug control of the seizures.

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THE MEDICAL ASPECTS OF AMATEUR BOXING*

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Boxing has a wide appeal both as a sport and as a spectacle, and it is estimated that there are at least 100,000 active amateur boxers in Britain. It offers the youth a healthy form of physical training, and as a result of abiding by the laws of boxing he learns discipline and self-control. In some cases it may be a suitable outlet for psychopathic traits, and it is playing a part in combating juvenile delinquency. It is obvious that the medical management of amateur boxing is of much importance, and we propose to consider this aspect as observed by one of us (J.L.B.) over a period of twenty-five years. Special reference is made to head injury and its sequelae, and to methods of preventing the latter. The use of the electroencephalogram (E.E.G.) in particular is dealt with.

Medical Management of Amateur Boxing

In order to make the sport as safe as possible the London Amateur Boxing Association has introduced a scheme of medical welfare which has been approved by the Amateur Boxing Association.

Most clubs have a medical officer, and each boy on joining is given a thorough medical examination. As well as the more obvious disorders, impaired vision or hearing and locomotor defects preclude a boy from boxing. If acceptable, he receives a booklet which he must produce at each contest, and in which is recorded any injury and the period for which he is debarred from boxing. Clubs sponsoring a tournament must supply an approved first-aid kit, and a medical officer is present at each contest.

*Modified from papers read at a meeting of the British Association of Sport and Medicine on March 19, 1954.

Certain rules have been introduced and suggestions made so that the boxers may be safeguarded to the full. Contestants are divided into juniors, who are aged 17 or under, and seniors above this age. The length of each round and the number of rounds boxed depends upon the age of the boxers. They are matched in accordance with age as well as with weight, so that boys meet opponents of their own experience. The referee, as well as being able to disqualify for the usual offences, has the power to stop a bout if a boy receives a bad cut, if he is obviously outclassed, or if he appears dazed on rising. The gloves weigh 8 oz. (230 g.) at least and are well padded; the laces and eyelets must be covered to prevent lacerations. Bandaging of the hands and the wearing of a resilient mouthpiece are encouraged. The London Amateur Boxing Association has recently approved the sorbo-rubber floor. It is hoped that these measures will help to make amateur boxing a safe sport.

Common Amateur Boxing Injuries

In the last seven years there have been six deaths due to boxing among amateurs, but on the whole the majority of the injuries observed have not been serious.

Nose-bleeding is the commonest, and plugging with adrenaline-soaked cotton-wool may be needed for the severe cases. The use of styptics or nasal stimulants is not allowed.

Cuts of the supraorbital ridges and zygomatic areas are also frequent, and are treated with a sterile plaster dressing, and thread sutures where necessary. If the wound is on the scalp, collodion is applied instead of plaster. When sutures have been used the boy is not allowed to box for four weeks, and if the scar becomes adherent, for two months. The more severe wounds are dealt with at hospital. This method of dealing with facial cuts is entirely satisfactory, although Continental officials claim equal success without the use of sutures. The early aspiration or evacuation of a *haematoma of the auricle* will avoid the disfiguring "cauliflower ear."

Sprains of the metacarpo-phalangeal joint of the thumb are very common, and are best treated with strapping, early movements, and later by short-wave diathermy.

The common fractures are, in order of frequency, the heads of the first and second metacarpals, Bennett's fracture, fractured nasal bones, and fractured mandible; the latter two are fairly rare in amateur boxing. Although intra-articular Bennett's fracture is known as "the boxer's fracture," it is not the commonest. In all cases splints are applied and the patient is sent to hospital; it is a rule that all boys going to hospital should be accompanied. In fractures of the nasal bones, the fragments are either thrust directly backwards or displaced to one side. The ensuing oedema may make replacement difficult, and the boy is therefore taken to hospital as quickly as possible. He is suspended for three months, and if nasal obstruction persists he is referred for surgery. A boxer sustaining a fractured jaw would be permanently suspended. Compared with rugby football (O'Connell, 1954), fractures appear to be relatively uncommon.

Ocular injuries are as rare as the periorbital ecchymoses are common. In 25 years' experience one of us (J. L. B.) has never seen a case of retinal detachment.

Head Injuries

Injury to the cranium and its contents is a direct product of boxing and not an accident as in all other sports. As the sequelae may, on rare occasions, be serious, more detailed consideration of this subject is necessary.

The six fatalities were all due to intracranial haemorrhage; unfortunately, a high mortality rate must necessarily be accepted in the acute extradural and subdural haematoma (Lewin, 1949). Other immediate complications, such as amnesia without unconsciousness ("out on the feet") and repeated knock-outs, are more common, but fractures of the skull and focal brain damage are extremely rare. The delayed sequelae, post-traumatic epilepsy, and the "punch-drunk" state, have never been encountered. That the latter may occasionally afflict the amateur boxer is, however, evidenced by Raevuori-Nallinmaa (1951), but medical control was perhaps inadequate in the cases cited. Finally, a post-concussional state may appear occasionally in the boxer who has received several knock-outs.

Most boxers after a knock-out have regained consciousness by the time ten has been counted. The seconds are instructed to carry the boxer to his corner if necessary, and not to hurry him back to the dressing-room. If the occasion arises, he is carried from the ring on a stretcher. In any case where recovery is incomplete or there is evidence of more serious damage, the boxer is sent to hospital. A youth who has been knocked out and recovers consciousness rapidly is suspended for two months, but if the injury is more severe, as judged by the post-traumatic amnesia, he is barred from boxing permanently. Boxers who are more easily knocked out ("knockout prone") are also permanently suspended.

Measures to Avoid the Sequelae of Head Injuries

One of the most important tasks in the medical control of boxing, both amateur and professional, is an attempt to avoid as many as possible of the complications of the head blows inevitably sustained by the boxer. The available methods of doing so, other than the general prophylactic measures already described, are unfortunately few. Clinical examination is crude and of little value in fit young men. Radiology has been considered, and Chenoweth (1951) surveyed the skull *x*-ray films of a group of college boxers. Because of thinning of the frontal bones, one aspirant was prevented from boxing. There is a suggestion that boxers who are knocked out more readily than others have thinner skulls, and it is known that in two of the six fatal cases mentioned already the skull vault was exceptionally thin. Further study of this interesting aspect of the head injury, and in particular as it concerns boxing, is needed. Until additional information is available, however, it does not seem justifiable to make decisions regarding a person's future in boxing on the basis of a skull *x*-ray examination.

Psychometric testing may detect the earliest evidence of mental deterioration, so that the initial stages of the "punch-drunk" state may perhaps be appreciated and the condition either forestalled or modified by abstinence from boxing. However, other evidence would, in most cases, be readily available. Because of the strict regulations employed, and the referee's powers, it is most unlikely that this pitiful sequel will ever be seen in amateur boxing.

The Electroencephalogram

The E.E.G. has been suggested as also having a possible part to play in the detection and prevention of cerebral complications, and an investigation into its application to amateur boxing was thought to be necessary. This test will obviously never predict a traumatic intracranial haemorrhage, although at times it is useful in diagnosis. Its use in other conditions following a boxing injury of the head is likely to be similarly limited.

Dow *et al.* (1944) were able to show that E.E.G. changes follow a blunt blow to the head. These appear immediately, and usually disappear within a few minutes. However, the more severe the injury the more severe and persistent is the electrical abnormality. This has been substantiated by Jasper *et al.* (1945), who also noted the not infrequent lack of correlation between the clinical and the E.E.G. findings. Further, they found that comparable trauma in a young person produced more severe changes than in the older subject. This observation is of importance to our present considerations because of the age group being dealt with, and deserves further elucidation.

Reports of the application of the E.E.G. to boxing are few. Titeca (1952) found abnormal records in two deteriorating boxers, and, although these abnormalities disappeared after two months' resting, subsequent events in these cases are not described. In Colorado, State laws make electro-

encephalographic examination compulsory for all professional boxers, and Busse and Silverman (1952) found abnormalities in 36.5% of 24. Although there was "some indication" that the severer disturbances were found in boxers who had been knocked out, a control group of non-traumatized males of similar ages was not investigated. One boxer with a persistent and progressive dysrhythmia was suspended from boxing, the decision being made on the grounds of the electrical changes only.

We have studied 48 amateur boxers electroencephalographically; 24 had received one or more recent knock-outs and the remainder, who acted as controls, had suffered none during the current season. Their ages varied from 17 to 29 years, and they were all examined within two weeks of the last injury. The investigation was somewhat hindered by the prejudices of the boxers or of their parents and officials, and, as the youths are all fully employed, it was often difficult to obtain a recording within the necessary time limits. Four of the group that had suffered knock-outs had abnormal E.E.G.s; all were under 20 years old. The abnormality observed was a diffuse slowing, and no focal dysrhythmia was recorded. In all cases it had disappeared within two months of the injury. One boy who had been knocked out four times took the longest period to return to normal, but, in common with Busse and Silverman (1952), other associations between the boxer's known history and the electrical changes could not be made.

Advantages From Use of E.E.G.—Although multiple records have rarely been obtained from subjects receiving repeated head injuries, it is possible that the E.E.G. can detect incipient chronic brain damage before clinical features become evident. The findings of Temmes and Huhmar (1952) tend to support this, although their evidence is not entirely convincing. A dysrhythmia, at first transient, may eventually become permanent in the presence of repeated trauma, and perhaps, as suggested by Busse and Silverman, this is the time to prevent a boxer from sustaining further cerebral damage. Only strict correlation with clinical findings and an adequate follow-up will decide this important point. It is remotely possible that a boy may have a hereditary epileptic tendency with an abnormal E.E.G. and that a head injury might precipitate convulsions. Phillips (1954), however, has shown that epilepsy follows a closed head injury in only 6% of cases and that pre-morbid tendencies play little or no part. A baseline E.E.G. on all boxing aspirants is therefore unwarranted. The use of the E.E.G. in the diagnosis of the post-concussional state, chronic subdural haematoma, focal brain damage, and post-traumatic epilepsy resulting from boxing injuries is well established and need not be discussed here.

Objections to Use of E.E.G.—We are dealing with a predominantly adolescent group, and it is well known that the normal maturation defects may cause confusion in the interpretation of the E.E.G. tracings. As has been pointed out (*Lancet*, 1953), this possibility cannot be entirely excluded from the findings of Busse and Silverman. Further, the more severe changes found by Jasper *et al.* (1945) in younger individuals, and the fact that all our subjects with abnormal records were less than 20 years old, are perhaps related to this. A baseline E.E.G. at the onset of a boxer's career might be expected to overcome some of these difficulties, but the gradual change associated with ageing would counter any advantage. The E.E.G. disturbances found in psychopathic personalities may also cause confusion (Hill and Watterson, 1942). Only routine E.E.G.s on all such persons beginning boxing would eliminate this difficulty. It is interesting in this respect to note that in Busse and Silverman's group those with temporal lobe foci were more aggressive. Finally, if clinical and electrical correlation is frequently lacking, it will be very difficult to draw conclusions in the individual case. It would therefore appear that the disadvantages outweigh the advantages.

Although information at the moment is inadequate, and although further evidence may show that the E.E.G. has a part to play in making boxing a safe sport, it seems unlikely that it will contribute greatly to amateur boxing. In professional boxing, where cerebral damage is more frequent and more severe, its role has yet to be decided. However, there is also the fact that boxing presents the only opportunity in man of observing repeated head injuries in an almost experimental setting, and further study of the E.E.G. changes will obviously be of considerable interest and value.

Conclusions

Amateur boxing is a useful and justifiable sport.

The medical amenities provided by the London Amateur Boxing Association afford adequate treatment of all the injuries encountered and the prevention of most.

The undesirable sequelae of boxing head injuries are rare among amateurs, mainly because of the rigid medical supervision. Their detection, however, is not altogether satisfactory at the moment.

Radiology offers a possible means, but present knowledge is limited.

The value of the E.E.G. in boxing is uncertain. Among amateurs its use is probably limited, but further information is required.

Summary

The medical supervision of amateur boxing (London Amateur Boxing Association) is described and the common injuries encountered are discussed. The head injury and its sequelae are considered in more detail and methods to eliminate the rare but undesirable complications detailed. The E.E.G. is a possible preventive measure, and its application is illustrated by an investigation of 48 amateur boxers. Although information is incomplete, it seems to be of doubtful value in amateur boxing if rigid medical control is practised.

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A catalogue of the National Collection of Industrial Bacteria has been published by Her Majesty's Stationery Office on behalf of the Department of Scientific and Industrial Research. The Department maintains a collection of bacteria of industrial interest at the Chemical Research Laboratory, Teddington. The collection was established in 1950 with a nucleus of about 200 bacterial cultures taken over from the National Collection of Type Cultures, Colindale. Since that time the collection has been increased by gifts from research establishments and individuals at home and abroad, and now comprises more than 750 different strains. The primary function of the collection is to supply the needs of industry, research, and educational establishments for cultures of industrial or scientific interest. The cultures are usually sent out as freeze-dried desiccates in sealed evacuated ampoules, but active cultures are also available. The catalogue is set out in alphabetical order by genera. The N.C.I.B. number of each strain is given and also the number under which the organism is listed in other collections. The name and laboratory of the donor are given, together with references to the literature and any special information about the strain. The catalogue costs 1s. 6d. net.

HYPERPYREXIA AND ANAESTHESIA

BY

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A recent fatality associated with anaesthesia displayed such remarkable features that it was thought useful to publish a short account of it.

Case Report

The patient, a girl of 13, was subjected to operation for recurrent dislocation of the patella. No abnormality was found on physical examination. Premedication consisted of morphine, ¼ gr. (8 mg.), and atropine, 1/100 gr. (0.65 mg.), given, as it happened, two hours before induction of anaesthesia. In the anaesthetic room the patient was perhaps (in retrospect) a little flushed, but seemed otherwise normal. Anaesthesia was induced smoothly with 0.4 g. sodium thiopentone, and continued with N_2O (5 litres a minute), O_2 (1.5 litres a minute), and minimal trichlorethylene ("trilene"), using Boyle's semiclosed circuit. A tourniquet was applied to the affected leg and the patient was taken into the theatre. It is regrettable, in view of what ensued, that no detailed records were made of pulse rate, blood pressure, etc., but this was regarded as a minor routine case.

The only complication observed in the course of forty minutes' anaesthesia was laryngeal "crowing," which was not affected by giving an O_2 and CO_2 mixture. It was not, however, regarded seriously, as the volume of respiratory exchange was adequate and the patient's colour was pink.

After forty minutes' anaesthesia, respiratory exchange suddenly decreased in volume. At the same time, clonic convulsive movements were observed in the arms and the abdominal muscles. Respiration stopped and some cyanosis occurred. Anaesthetic administration was stopped, oxygen was given by forced inflation, and the head was raised. In about thirty seconds the movements stopped, respiration of full volume was restored, and the colour once more became pink. It was then noticed that the patient's skin was very hot. The axillary temperature was taken and found to be 108.6° F. (42.6° C.). A second thermometer was sent for; the temperature was taken again, and found to be 110° F. (43.3° C.). Anaesthesia was discontinued, though O_2 was still given. The theatre temperature was 79° F. (26.1° C.).

The patient was removed to an adjoining room and stripped; the windows were opened; and sponging was started with ice-water, particularly over the groins, neck, axillae, and praecordium. About twenty-five minutes after the first untoward signs were noted the temperature had fallen to 104° F. (40° C.). After another fifteen minutes it had fallen to 102° F. (38.9° C.). The pulse rate had now risen to about 200 a minute. Some signs of spasticity appeared in the limbs, but there was no return of consciousness. Peripheral circulation returned very slowly to the affected leg after removal of the tourniquet. The patient was returned to bed, covered by a sheet, the head was kept raised, O_2 was administered, and a glucose–saline drip was started. When the patient was seen a little later by a neurosurgeon he considered that she showed signs of a brain-stem lesion. About seven hours after the first untoward signs were noted the patient died.

At necropsy the body showed marked cyanosis. The operation site presented no unusual features. The upper respiratory tract was healthy. The tonsils were enlarged, and the lymphoid tissue at the base of the tongue was hypertrophied. The thymus was prominent, the lungs were congested, and the heart was normal.

On opening the skull the dura was seen to be a little tense, and the cerebral hemispheres were slightly dry and a little flattened, suggesting increased cerebral pressure. This was confirmed by a small cerebellar pressure cone. The brain was deeply congested and markedly oedematous, but no abnormality was found on careful dissection of the cerebral blood vessels. No other abnormalities were found in the brain, brain stem, or spinal cord.

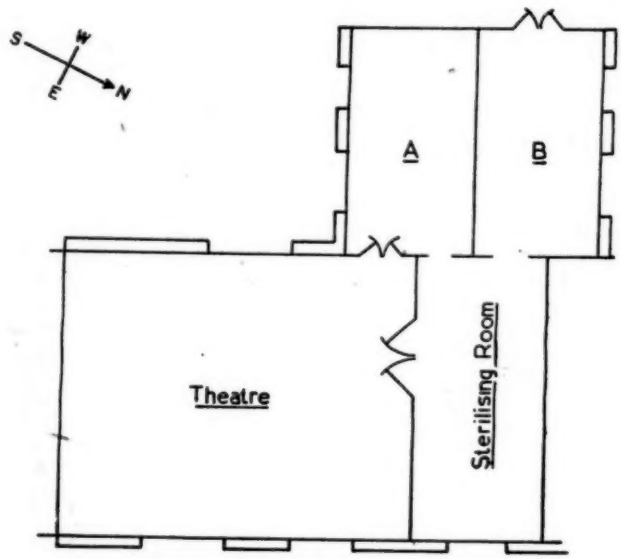
The pathologist concluded that death was due to comato-asphyxia following anaesthesia.

Investigations

Although it was thought unlikely that there was any connexion between the occurrence and the actual trichlorethylene used, it was suggested that a sample should be analysed. Unfortunately, none from the same tin was available, but a tin of the same batch was taken from stock, analysed, and found to be in complete conformity with *B.P.* standards.

This distressing case led to some routine observations of axillary temperature changes in patients before and during anaesthesia. One child was found to have a temperature of 101.4° F. (38.6° C.) in the theatre. Another child had a temperature of 100.5° F. (38° C.). This led to some consideration of environmental factors.

The theatre concerned is air-conditioned. The anteroom (A in Diagram) in which patients lie until they are anaesthetized is not air-conditioned. This room has large windows, and is so positioned that the sun, when unobscured, shines directly into it all morning. There is a corresponding anteroom, B, adjacent to A, which is not exposed in this fashion to the sun. Records were kept by wall thermometers of the temperature changes in the three rooms on ten days in the months of June–September, 1954. A record was also made of the wet-bulb temperature, using a whirling psychrometer. (According to Clark *et al.*, 1954, the wet-bulb temperature is the best measure of thermal tolerability. They claim that heat retention is unlikely in adults if the wet-bulb temperature is under 75° F.—23.9° C.)



Plan of part of the theatre suite.

The theatre temperature varied from 73 to 80° F. (22.8 to 26.7° C.). On an isolated occasion it rose to 83.5° F. (28.6° C.) for a brief period. The wet-bulb temperature did not exceed 66° F. (18.9° C.) on any occasion on which it was measured. The temperature in room A varied from 79 to 85° F. (26.1 to 29.5° C.). The wet-bulb temperature did not exceed 69° F. (20.6° C.). In room B the temperature varied from 73 to 79.5° F. (22.8 to 26.4° C.), with a maximum wet-bulb temperature of 66° F. (18.9° C.).

Observations were not possible in conditions approximating to those of the day of the fatality until late in September. This was a rather cool morning, but there was brilliant sunshine. Radiators were not in use. At 1.30 p.m. the shade temperature in room A was 85° F. (29.5° C.) (the sun temperature was 95° F.—35° C.). The wet-bulb temperature was 69° F. (20.6° C.). In room B the shade temperature was 79.5° F. (26.4° C.) and the wet-bulb temperature was 66° F. (18.9° C.). In the theatre the shade temperature was 79° F. (26.1° C.), the wet-bulb temperature was 66° F. (18.9° C.) and the temperature under the mackintosh sheet which covered the patient was 91.5° F. (33.1° C.). (On another day, when the theatre temperature was 73° F. (22.8° C.), the temperature under a mackintosh sheet covering a patient was 87° F.—30.6° C.)

No other marked rises in axillary temperature were found, but a slight rise of the order of 0.5–1° F. (0.3–0.6° C.) was frequently observed in young patients confined in room A on sunny days. The deceased had lain in room A for one and a half hours at the hottest part of the day. This was most unusual, and was due to an unexpected prolongation of the preceding operation.

Discussion

The most striking feature of this case is the extreme hyperpyrexia. It is difficult to believe that the very brief convulsive episode was responsible for a rise of temperature to 110° F. (43.3° C.). Even after lengthy and severe convulsions in a 12-year-old boy, Wright (1933) records a temperature of only 106.8° F. (41.6° C.)—the temperature at the beginning of the operation being 101° F. (38.3° C.). Convulsions have been reported in association with trichlorethylene anaesthesia by Culbert (1942), by Garland (1942), and by Condon (1948). In each of those cases the patient's temperature was normal both before and after the convulsions.

While it is unlikely that the wet-bulb temperatures exceeded the limits of thermal tolerability for an adult on the day of the fatality, they may have done so for a patient such as this 13-year-old girl. It is probable that her temperature started to rise in room A, and continued to rise in the theatre, when partly covered by a mackintosh sheet and wholly covered by drapes. It is perhaps worth considering whether this, in a convulsion-prone individual, would initiate convulsions, which would cause further pyrexia. It is perhaps worth emphasizing that when a patient is covered by a mackintosh sheet the temperature under the sheet may exceed the theatre temperature very considerably.

The subject of hyperpyrexia in the post-operative period has been ably reviewed by Mangiardi (1951), who claims that patients can survive a temperature of over 108° F. (42.2° C.) with full recovery.

Summary

A fatality associated with the anaesthesia of an apparently fit girl of 13 is recorded. The outstanding features were a brief convulsive episode and a hyperpyrexia of 110° F. (43.3° C.). No lesion which might account for this was found in the brain at necropsy. Some environmental factors that may be significant are reported.

I am indebted to Dr. H. H. Pinkerton for advice, to Dr. H. E. Hutchison for the necropsy report, to May and Baker Ltd. for help with references, and to Imperial Chemicals (Pharmaceuticals) Ltd. for the analysis of trilene.

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PRURITUS IN MELANCHOLIA

BY

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Emotional states have long been recognized as causative agents in some skin reactions. The literature contains many references to the psychological factors found in sufferers from skin complaints. MacKenna (1944) had correlated particular skin reactions with different personality types. Hellier (1944) has drawn attention to environmental and psychological influences in skin conditions. He states: "He [the eczema patient] may adjust himself to the environment, but the rash is likely to return at puberty, at the menopause, or old age, or at any other time when things go against him." Hall-Smith and Norton (1952), in a psychiatric survey of a random sample of skin out-patients, found psychological factors in 78.5% of their patients. Of these, the largest group contained those of the anxious-obsessional type. There were no psychotics in their series, and they remarked that the symptoms characteristic of endogenous varieties of depression were conspicuously absent.

That a relationship exists between psychological factors and skin reactions appears to be generally accepted. In most cases reported in the literature the patients were clearly considered to be showing a neurotic reaction, and little mention is made of psychosis. Shorvon, Rook, and Wilkinson (1950), in reporting on the treatment of 50 cases of dermatitis by abreactive techniques, mentioned that one of the cases was psychotic and failed to respond to treatment. On the other hand, Forman (1954), in a review of cases of pruritus, found that in 23 of his 62 cases psychological factors appeared to be causative, and of those 23 cases it seems likely, from the diagnosis made, that four were psychotic.

It is, however, generally less appreciated that pruritus and skin reactions may be due to melancholia, and the following cases are of interest in that respect.

Case 1

A spinster of 55 years was seen in the wards of a general hospital nine days after she made a suicidal attempt by taking 66 ½-gr. (32-mg.) tablets of phenobarbitone. At that time she was agitated and depressed, expressing marked ideas of hopelessness. Her skin condition was poor. She had a weeping dermatitis of both arms, shoulders, breasts, and buttocks which she managed to scratch despite the covering bandages.

Her history showed that the dermatitis had started in 1946 and had not responded to any form of treatment. She had also suffered from poor, disturbed sleep and loss of appetite over the previous three to four years. These symptoms had been attributed to the dermatitis and pruritus. More recent symptoms were loss of taste and smell.

She was admitted to the reception unit of the North Wales Mental Hospital in May, 1952, when the diagnosis of endogenous depression was made. Her skin condition, with the intense pruritus and weeping dermatitis, was considered to be secondary to her mental state and was treated conservatively with bland ointments only. In view of the risk of another suicidal attempt, electric convulsion therapy (E.C.T.) was started without delay.

The initial response to treatment was good, both her depression and her dermatitis largely clearing up. A month after admission, however, the agitation and depression

returned, to be followed by a recrudescence of the dermatitis. Despite further E.C.T. and a course of modified insulin therapy, little further improvement was obtained, and she was discharged, relieved, in July, 1952.

She was followed up at the out-patient clinic for the next few months, but she became so depressed that it was thought prudent to readmit her, and she entered hospital again in November. Her skin and mental conditions were similar to those on her first admission, and she was again given a course of E.C.T., to which she once more partially responded. After her discharge in January, 1953, she was again followed up at the clinic, and at first made some progress. In the spring she began to deteriorate again. Her skin condition, which had previously cleared up apart from patches on her arms, flared up in response to the increased pruritus, and the agitation and depression returned.

In view of her repeated relapses, the operation of bilateral prefrontal leucotomy was thought to offer the best chance of recovery, and this was performed in July, 1953. Following the operation her agitation disappeared, and within three weeks her skin was clear apart from residual roughness in the flexures of the elbows. Her mental condition also progressively improved, so that it was possible to discharge her to the care of her relatives in September. She was last seen in March, 1954, when she was at home, looking after her own house and garden, and very happy. Her skin was quite soft and showed no trace of the previous lesions.

Comment.—This patient has undoubtedly done very well, and the recovery from her depression was reflected in the clearing of her skin lesions. It seems almost certain that the skin lesions were essentially due to scratching in response to the pruritus that was itself a symptom of her depressive illness. This view finds support in the following : (1) the skin condition was unrelieved by any form of local medication ; (2) it was improved by E.C.T., and a worsening of the skin condition followed, rather than preceded, a relapse in her mental state ; and (3) both the dermatitis and the depression were finally cured by leucotomy.

Case 2

A married woman aged 30 was admitted to the North Wales Mental Hospital in June, 1952. She gave a history of an intense pruritus following an attack of measles in August, 1951. She had, as she put it, scratched herself to bits.

On examination she was agitated and depressed. Her thought content revealed preoccupation with ideas about death, and she admitted suicidal thoughts. Her skin condition appeared to be that of a seborrhoeic dermatitis, especially in the face and scalp, but there was a well-scratched rash involving the whole body. She also had pruritus vulvae. The diagnosis of endogenous depression was made and she was given a course of E.C.T. After the second treatment the pruritus had gone, and at the time of her discharge she had made a good recovery from both the skin condition and the depression. Traces of seborrhoea remained on the face and scalp, but there was no irritation.

Case 3

A married woman aged 37 was seen at the out-patient clinic in November, 1951. At that time she presented as a case of endogenous depression. She was depressed, agitated, and a little retarded. She expressed marked feelings of hopelessness and had suicidal thoughts. In view of the severe depression she was admitted to the North Wales Mental Hospital, where she made a good recovery and was discharged in December. She was again seen at the out-patient clinic in June, 1952, having been referred back to us by the dermatologist. At that time her main complaint was a severe itching, particularly in the pubic and anal regions. Examination revealed an urticarial rash, well scratched, all over the body, and excoriation of the perineum and vulva. Her mental condition was similar to that of her first referral. She was readmitted to hospital and responded well to a further course of E.C.T. At the time of her discharge she had recovered from her depression, and her skin condition and pruritus had gone.

This case is interesting in that pruritus was not a symptom of the initial depressive attack, but occurred in the second episode and was associated with a marked increase in agitation.

Case 4

A married woman of 46 was referred to the out-patient clinic in November, 1953, because of pruritus vulvae and a general nervous condition. The pruritus did not worry her during the day, but, although she was able to get to sleep, she was awakened in the early hours (2 a.m.) by the vulval irritation and was unable to sleep properly afterwards. On examination she was agitated and depressed, with ideas of hopelessness and unworthiness. In view of her distressed condition she was admitted to the North Wales Mental Hospital. A diagnosis of recurrent depression was made and she was given E.C.T. On this treatment she lost her pruritus and her depression cleared.

This patient's past history is interesting in that she had had three previous attacks of pruritus, and careful inquiry showed that she also had symptoms of an endogenous depression at the same time. During one episode she developed a generalized pruritus, associated with an urticarial reaction, as well as the pruritus vulvae.

Case 5

A married woman aged 50 was admitted to the North Wales Mental Hospital in February, 1953. Her main complaint was of intense pruritus involving the whole body. She described the pruritus as a feeling of swelling and burning in her skin, and that she had to scratch.

On examination she proved to be tense, depressed, tearful, and agitated. She was extremely garrulous and hypochondriacal. Despite some reactive factors, it was felt that the underlying illness was that of an involutional melancholia. Her skin condition was a papular erythematous rash covering most of the body, and well scratched. Her history showed that the rash and nervous trouble followed an operation in December, 1951.

In hospital she was given a course of E.C.T., to which she partially responded. Her skin condition improved as her agitation decreased. At the time of her discharge she was mentally much more stable, although still agitated and easily upset. The skin condition had cleared apart from patches in the flexures of the elbows.

Case 6

A single woman of 59 was admitted to the North Wales Mental Hospital in April, 1950. There was a family history of psychosis and an aunt had committed suicide. The patient herself was diagnosed as suffering from an agitated melancholia, and the illness appeared to have started eighteen months previous to admission and followed an operation for varicose veins.

When she came into hospital she was restless, agitated, and depressed, complaining continually of a dermatitis, which she persistently scratched. The dermatitis involved the limbs and trunk, and had developed after the varicose-vein operation. It had proved resistant to treatment, and her thought content was entirely filled with her skin condition and the hopeless outlook for the future. During her stay in hospital she was given a course of E.C.T., and on her recovery from the depressed state the skin condition cleared up.

Discussion

Six cases of pruritus in melancholia have been described ; five other cases of a similar nature have also been admitted to the women's reception unit during the same period. Although these cases amount to only just over 1% of melancholics admitted to this unit, the relief given to their skin complaints by treatment of their mental condition seems to justify the publication of this type of case.

Although the details of each case naturally differed, there were certain similarities between them. In each case pruritus, rather than any particular skin reaction, was the main feature, and this was associated with agitation. The skin reaction appeared secondary to the pruritus and could be shown to be due to scratching. Thus relief of the depression obtained by use of E.C.T. was accompanied by a cessation of pruritus and an immediate improvement in the skin condition. In those cases in which a relapse of the depression occurred it was noticed that pruritus, with scratching, returned before the skin condition reappeared.

All cases showed evidence of the endogenous type of depression. Disturbed sleep, with early waking, loss of weight and appetite, and low spirits, with diurnal variation, were common. The favourable response to E.C.T. was also confirmatory evidence of the affective nature of the illness. Apart from ideas of hopelessness, however, none of the patients showed psychotic thought content. This fact is interesting and perhaps explains why the depressive nature of the illness remained unrecognized in some cases for months or years.

It is well known that anxiety and obsessional states may be symptoms of an underlying depression, and the neurotic picture so presented may be misleading. That somatic symptoms are also common is equally well known, but it does not appear to be generally recognized that pruritus, with skin reaction, may be the main presenting symptom of melancholia.

In some instances the response to E.C.T. was dramatic, in others less so, but in every case the skin condition closely followed the mental state of the patient. No claim is made that E.C.T. benefits skin conditions as such, except when they are secondary to a disorder that itself responds to E.C.T.

Summary

Six cases of melancholia complicated by pruritus and skin reactions are described. All cases benefited from E.C.T., although in one case neither the depression nor the skin condition was cured until leucotomy was performed.

Evidence has been brought to show that the pruritus was secondary to melancholia and could rightly be regarded as a symptom of it. This fact does not seem to be generally appreciated.

I would like to thank Dr. J. H. O. Roberts, medical superintendent of the North Wales Hospital, for permission to publish these cases.

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An article in the December issue of the *NAPT Bulletin* discusses what the doctor should tell the patient with suspected tuberculosis. "There is an art in these things," it says, "an art not always taught in medical schools. It is not what the doctor says, or leaves unsaid, but the way he does it. The greatest clinicians have practised this art to perfection upon patients and relatives. To watch them at work, or even to read their clinical letters, is an education. They don't necessarily 'tell.' It is not a question of facts at all. But they can generally relieve the tension in the patient's mind. The greatest clinicians have the power to communicate a real dilemma in a way that causes least distress. They can confess ignorance without losing face. They express a danger in such a way that it braces the patient to put forth his best effort. It is not humbug. On the contrary it is the finest expression of medical skill."

CASE OF ACHLORHYDRIC ANAEMIA IN A MALE FOLLOWED UP FOR 20 YEARS

BY

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In 1933 I wrote a paper with my then house-physician, Dr. W. Weisswange, on "Simple Achlorhydric Anaemia in Adult Males."* It is well known that typical achlorhydric or hypochlorhydric anaemia is very much rarer in males than in females and that the history of male cases, if followed up for a number of years, often discloses peculiar features or associations. The following history is that of Case 4 in the above-mentioned paper.

Case Report

A commercial traveller and collector aged 32 came under observation in December, 1932, with the history that he had looked pale for a long while and had had dyspeptic troubles for the previous four months. For some time he had had a sore tongue, which the dentist told him was not due to his teeth. In 1931 he had had double pneumonia, and (at another hospital) was given two blood transfusions. Blood count (December, 1932): haemoglobin, 38% ; erythrocytes, 2,400,000 ; C.I., 0.8 ; leucocytes, 5,750 per c.mm. (polymorphs 77%, lymphocytes 20%, monocytes 3%); anisocytosis, poikilocytosis, and a little basophilia punctata. Fractional examination of the gastric contents showed complete achlorhydria, even after the subcutaneous injection of histamine; pepsin present after the histamine. Brachial systolic blood pressure: 115/45 mm. Hg. Negative Wassermann reaction. Vitiligo. In February, 1933, the spleen could be felt during inspiration.

The presence of achlorhydria was confirmed in January and July, 1933. In July no enlargement of the spleen could be detected, and the blood count gave: haemoglobin, 75% ; erythrocytes, 5,000,000 ; C.I., 0.75 ; leucocytes, 6,950 per c.mm. (eosinophils 2%, polymorphs 62%, lymphocytes 29%, monocytes 7%) ; very slight anisocytosis and poikilocytosis. The out-patient treatment, doubtless somewhat irregularly taken, had been ferrum reductum and an acid pepsin mixture with meals. Dr. Price-Jones, who examined blood films of December, 1932, and February, 1933, wrote that the extreme degree of poikilocytosis did not suggest simple microcytic anaemia.

The patient was readmitted to the German Hospital on September 18, 1936, in a more anaemic condition: haemoglobin, 60% ; erythrocytes, 3,660,000 ; C.I., 0.82 ; sedimentation rate, 14 hours (Linsenmeyer). A complete gastric achylia, even after subcutaneous injection of histamine. *X*-ray examination of the stomach showed nothing abnormal. After four weeks at the German Hospital he left very much improved. In the out-patient department on November 12 his erythrocytes were 5,400,000 ; haemoglobin, 82% ; C.I., 0.75. At this period he sometimes seemed queer in his head. He would complain of various peculiar subjective feelings, notably as if part of his face was absent (unreality feelings). He was given a letter for the out-patient department of the Maudsley Hospital, which communicated with the German Hospital, the patient being under the care of both hospitals jointly.

Mrs. S. Brock, of the German Hospital, has kindly looked up the scattered notes relating to the patient and the correspondence about him with other doctors until 1952. I myself last saw the patient some time before 1952, and I am indebted to Mrs. Brock for a summary of the notes and correspondence about him, and also to Dr. H. C. Lauber

*F. Parkes Weber and W. Weisswange, *British Medical Journal*, 1933, **2**, 1066.

and my colleagues at the German Hospital and their correspondents for being able to use this material.

November, 1936.—The patient was queer in the head and very forgetful (out-patient department). Complete achylia even after histamine.

February, 1937.—Out-patient at Maudsley Hospital.

Summer, 1942.—Still had unreality feelings (face); tongue protruded slightly to right; right plantar reflexes doubtful; spleen moderately enlarged; question of "splenic anaemia"; sternal puncture said to show a typical megaloblastic picture; C.I. usually against Addisonian anaemia.

October, 1942.—Dr. Wyburn-Mason, at the National Hospital, Queen Square, found no definitely abnormal physical signs in the central nervous system. The right plantar reflex was not so definitely flexor as the left, but there was no doubt that it was flexor. The only other finding was a left supinator jerk which was perhaps brisker than the right. Dr. Wyburn-Mason thought that at that time there were no definite signs of neurological disease and suggested that the mental symptoms were either connected with the anaemia or were hysterical.

1942 to June, 1946.—The patient was treated as an out-patient and on several occasions as an in-patient for his anaemia, but on many occasions he complained of heaviness, etc., in his head.

June to August, 1946.—In-patient at Roffey Park Rehabilitation Centre. On his discharge the medical officer reported to the German Hospital that it had become apparent, during the patient's stay there, that he was suffering from a paranoid schizophrenic illness. He had undergone a course of electrical treatment which had improved the depressive symptoms.

1946 to April, 1952.—The patient continued to attend the medical out-patient department. His anaemia appeared to remain controlled on "anahaemin" injections, 2 ml., which towards the end of this period were given once a month. *Blood count* (June 1, 1950): haemoglobin, 80%; erythrocytes, 5,280.000; C.I., 0.77; P.C.V., 42%; M.C.V., 80.8 cubic microns; M.C.H.C., 21.5%.

March 1950.—Bassini's operation for right inguinal hernia was performed at the German Hospital. Post-operative progress was uneventful.

July, 1952.—At the request of his local doctor the patient was seen by Dr. E. R. W. Mons, psychiatrist to the German Hospital. He complained of his "head getting hot all over" and also of "pins and needles," dyspnoea, nervous dyspepsia, and occasional blurring of vision when reading. He has not attended the psychiatric out-patient department since then.

Recent Blood Counts.—January 8, 1952: haemoglobin, 70%. March 13: haemoglobin, 82%; leucocytes, 6,200 per c.mm. April 24: haemoglobin, 84%; erythrocytes, 5,430,000; C.I., 0.8; differential count—neutrophils 67%, lymphocytes 24%, eosinophils 9%; erythrocytes appear hypochromic with slight polychromasia.

May 18, 1953.—Returned from Brentwood Mental Hospital. Attended medical out-patient department of the German Hospital (Dr. Mills Hall), but was referred to the psychiatrist (Dr. Mons).

June 11, 1953.—Seen by Dr. Mons in the out-patient department. Patient feels quite well now. Has been back to business for two weeks, is taking things slowly, and says he can manage. In Brentwood on arrival he had had electric convulsion treatment, and eight treatments after seven months. He was told to report to Whipps Cross Hospital (Dr. Copeland) if a relapse occurred. He was discharged from Dr. Mons's psychiatric out-patient clinic.

In this short summary it has been impossible to include all the diagnostic and therapeutic tests and trials that have been made or suggested, but the account suggests that amongst the symptoms complicating cases of achlorhydric anaemia in males must be reckoned symptoms resembling those of so-called temporal lobe epilepsy and various schizoid manifestations.

Medical Memoranda

Fatal Rupture of Retro-pharyngo-oesophageal Abscess

We have been unable to trace any record of a case resembling the one reported below, which may therefore be found of interest.

CASE REPORT

A previously healthy girl aged 10 was admitted to Neasden Hospital at 3.15 p.m. on June 11, 1952, with a history of a sore throat on June 4 and subsequent swelling of the glands. She had been treated with sulphonamides and chloramphenicol.

On admission the temperature was 100.6° F. (38.7° C.), pulse 110, and respiration rate 28. There was mild stridor, nasal speech, marked cervical adenitis and periadenitis in the anterior and posterior triangles. The post-pharyngeal wall was inflamed and oedematous, with no evidence of abscess formation. She swallowed fluids without difficulty. Further physical examination was negative. The blood showed a leucocytosis of 19,800 cells (79% polymorphs).

Intensive penicillin and sulphonamide therapy, with antihistamines, was instituted immediately and a kaolin poultice applied to the neck. At 11.55 p.m. the girl suddenly became cyanosed and rigid, and stopped breathing. Tracheotomy was at once performed and a tube inserted, through which a large amount of thin brownish fluid exuded from the trachea. Despite postural drainage, continued artificial respiration, and intracardial nikethamide, she died immediately.

Bacteriological investigation of the pus revealed large numbers of yeasts and non-haemolytic streptococci—no tubercle bacilli or anaerobes.

Post-mortem Examination (Dr. R. Donald Teare).—"An extensive abscess occupied the posterior pharyngeal region from the uvula and tonsillar region down to the arch of the aorta. It had recently ruptured into the pharynx and flooded the trachea and bronchi with pus, which was very offensive. No foreign body or mark of a foreign body was found."

COMMENT

There was no history of injury from foreign body or food. Chemotherapy localized the pus. It would appear that, had there been a pointer, a barium swallow *x*-ray examination or oesophagoscopy might have led to diagnosis.

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Fixed Sulphonamide Eruption Simulating Early Syphilis

Sulphonamides are a rare cause of "fixed drug eruption." Robson and Keele (1950) define a fixed eruption as being "characterized by the rapid development of one or more sharply circumscribed lesions on the skin or mucous membranes as an invariable response to the administration of the offending drug." A case presenting this phenomenon in which the eruption closely resembled early syphilis is worth recording.

CASE REPORT

A married tile-fireplace maker aged 28 was referred to the department of venereology, Doncaster Royal Infirmary, with a penile sore and "mucous patches" on the tongue of about eight days' duration. He denied extramarital intercourse. It transpired that ten days previously he had consulted his family doctor, who prescribed sulphapyridine tablets for a mild attack of erysipelas affecting the left ear. Two days later an irritating rash appeared on the scrotum. The following day a similar rash appeared on the penis and left side of the neck, and slightly painful ulcers appeared on the tongue. He reported back to his doctor, who prescribed promethazine hydrochloride tablets with little relief

of his symptoms. Three days later he was referred to the dermatologist, Dr. J. Savage, who sent him to the department of venereology, as he deemed it wise to exclude specific disease first.

On examination a sharply circumscribed tender non-indurated squamous erythematous eruption ¾ in. by ½ in. (1.9 by 1.3 cm.) was present on the left side of the glans penis. A similar eruption was present on the scrotum and on the left side of the neck. Sharply demarcated circular,

FIG. 1.—Sulphonamide eruption on the penis and scrotum.

slightly tender, superficial ulcers ¼ in. (3 mm.) in diameter were present on the dorsum of the tongue. There was no significant adenopathy. No condylomata were detected.

Repeated dark-ground examination failed to reveal *Treponema pallidum* in the penile lesion. Blood was taken for Wassermann and Kahn tests. A tentative diagnosis of sulphonamide sensitivity was made, no treatment was prescribed, and the patient was requested to return in seven days' time. When he reattended on the specified date the eruption on the penis, scrotum, neck, and tongue had cleared up, leaving no sequelae. The blood Wassermann reaction and Kahn test were negative.

FIG. 2.—Sulphonamide eruption on the tongue.

He was given a test dose of four tablets of "sulphatriad," and within 30 minutes of ingestion he experienced irritation of the penis and scrotum at the site of the previous lesions. Within two hours his tongue and roof of mouth felt very warm. The following morning an eruption similar to the original one appeared (Figs. 1 and 2). No treatment was given, and six days later the eruption had completely cleared up.

COMMENT

This case is of interest in that the eruption somewhat resembled lesions seen in early syphilis. The ulcers on the tongue were reminiscent of the classical mucous patches seen in secondary lues. Cole (1946) recorded three cases of fixed eruption of the buccal mucosa and penis due to sulphadiazine. Meltzer (1949) reported a fixed eruption on the right thumb and penis following the ingestion of various sulphonamides. Philpott (1951) described a fixed eruption on the chest and glans penis due to sulphadiazine. Ghosh (1952) described repeated attacks of swelling of the lips, anus, and external urethral meatus accompanied by the appearance of erythematous plaques on the left hypochondrium and medial border of the right foot as a manifestation of fixed drug eruption due to sulphonamides. Campbell and Doyle (1953) reported recurrent balanitis as a manifestation of fixed sulphonamide eruption.

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Poisoning Due to Belladonna Plasters

A woman aged 67 was admitted to the Grove Hospital, S.W.17, at 4.15 a.m. on April 11, as a possible case of meningitis or cerebral haemorrhage. She had a history of occasional occipital headaches for the previous few months, but had not complained of headache during the course of the illness for which she was admitted. At 6 p.m. on the day before admission she developed a queer sensation in the eyes with a "muzzy" feeling in the head, and during the course of the evening, while watching television, she was mystified to find that she could not see clearly, and kept wiping her glasses, thinking that they were smeared.

At 10.30 p.m., when she went to bed, she felt she could not keep her legs still, and thereafter remembered no more until her return to consciousness. At 2 a.m. she disturbed her husband by becoming delirious and excitable and making writhing movements with her hands. When the doctor arrived he found her delirious, flushed, with pupils dilated and equal, and non-reactive to light. She was muttering and sitting up in bed, and resisted attempts at restraint. There was marked tachycardia. Morphine, 1/6th gr. (11 mg.), was given, and penicillin, 500,000 units, at 3.30 a.m.

On arrival in hospital she was flushed and semi-comatose. There was no meningism. The pupils were dilated and equal and non-reactive, and the optic fundi were normal. The arms were held rigidly in flexion and the biceps reflexes were brisk. The abdominal reflexes were absent. The legs were held stiffly with no detectable difference in tone. All the leg reflexes were exaggerated and the plantar responses were extensor.

On further examination a large belladonna plaster was found adhering to the skin on each side of the back. On removal of these the skin was found to be excoriated. The plasters were replaced by tulle gras. It appeared that the patient had been suffering from backache for some weeks and had been applying the belladonna plasters on her own initiative for a month, replacing them weekly without an interval. Her husband had assisted her to the bath at 4 p.m. on the night before admission and had observed that the skin was very raw before the application of the new plaster.

Within 12 hours of admission the patient was back to her normal state of consciousness, but the pupils remained somewhat dilated for more than 36 hours. The back healed up in about ten days. Before going home she was given tincture of belladonna, 7 minims (0.42 ml.) t.d.s., for two days, to see if there was undue sensitivity, but no symptoms resulted.

It is of interest that Bruce and Dilling (1918) mentioned the possibility of this complication of the topical use of belladonna, but Dilling (1940) makes no reference to the danger, no doubt because of the infrequency with which these plasters are now prescribed. But they can be readily obtained by the lay public.

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Reviews

NEUROSURGERY

Pictorial Introduction to Neurological Surgery. By G. F. Rowbotham and D. P. Hammersley. (Pp. 108; 81 figures. 21s.) London and Edinburgh: E. and S. Livingstone. 1953.

Operative Neurosurgery: with Emphasis on Procedures in Trauma. By Elisha Stephens Gurdjian, M.D., and John E. Webster, M.D. (Pp. 442; 129 plates. 76s. 6d.) London: Baillière, Tindall and Cox. 1953.

The task of the medical artist is no easy one. Not only has he to divide up an operation into a series of steps in order, as Mr. Hammersley puts it, to tell a story, but he must emphasize those particular features of each step which are important without distorting the picture as a whole. Moreover, the artist cannot hope to satisfy all who seek guidance on particular operative points, for, despite the uniformity of many procedures, surgery is essentially a personal affair and one surgeon's difficulty is not another's. These recently published volumes on neurosurgical technique show two ways by which the problem may be approached.

The *Pictorial Introduction to Neurological Surgery* describes the principles of operative neurosurgery and the particular management of head injuries; other aspects of neurosurgery are not considered. It is beautifully produced and a credit to authors and publishers alike. The illustrations are a clever combination of the various styles of drawing; they are clear, not over-detailed, and where necessary realistic. The whole effect is restful to the eye, and one is led on easily from one stage to the next. The surgeon called on to operate on head injuries will find here clear instructions on the management of scalp wounds, fractures, and surface haematomata. It is perhaps surprising to note the emphasis on firm closure of the dura in the management of compound fractures, and the advice to split the tentorium cerebelli if, after evacuation of an extradural clot, consciousness is not returning within half an hour. Both these points require considerable judgment and experience, and in a book of this nature they should probably be mentioned with qualification. The authors have not set out to write a comprehensive book, and its format suggests that it may be introductory to a more ambitious programme. The general surgeon may wish for further details of the commoner procedures, and the neurosurgeon a fuller consideration of the operative management of head injuries than are here given, and it is hoped that the authors will be encouraged to enlarge this section in future editions.

Operative Neurosurgery has a wider scope and, indeed, covers the whole range of neurosurgical procedure, including spinal, sympathetic, and peripheral nerve surgery. Miss Lariviere has chosen diagrammatic sketches entirely as the method of illustration. They are bold, accurate, and skilfully done. The method is seen at its best in the positioning sketches, the introductory stages of the operation, and the diagrams of blood supply. Its defects are apparent in the illustrations of procedures on the brain itself, where not infrequently the instruments and surrounds stand out in bold relief against the tissue which should really be engaging the reader's attention. The commendable attempt to have the illustrations opposite the appropriate text has led in some instances to overcrowding of the diagrams which is confusing; but we should welcome this imaginative approach to the problem, and surgeons will find in this book many novel and useful illustrations of detail. The text is clear and contains a surprising amount of information in a relatively small space. Other features are the brief historical accounts and the useful anatomical notes which accompany the various operative procedures. Altogether a reliable and comprehensive guide for the young neurosurgeon.

WALPOLE LEWIN.

"CHILDBIRTH WITHOUT FEAR"

Childbirth without Fear. By Grantly Dick Read, M.A., M.D. Third edition, revised and enlarged. (Pp. 243; illustrated. 10s. 6d.) London: William Heinemann. 1954.

This is one of several books in which Dr. Dick Read expounds his well-known views and methods, which he defines as "the activities of an obstetric gardener who plants and tends his most precious flowers in their natural environment and protects them from the pests that could injure or destroy." The new chapters and changes in this edition are characterized by repetition rather than innovation, and are coloured by extravagant phraseology and by the author's concern to do battle with all who have questioned or criticized his earlier work. Let the author speak for himself: "Some of my colleagues, for whose academic attainments I have great respect, argue: 'You assume too much; this is not proved; this is not strictly scientific. We do not agree with your neurology and your psychiatry is misleading, therefore you must be wrong.' My reply is, with all humility: 'Yes, of course, and I return to the labour ward to be greeted by happy women with their newborn babies in their arms: "How right you are, doctor, it is so much easier that way."' That is what really matters to the clinician." If this is the basis for Dr. Read's convictions, then it is natural to wonder why he finds it necessary to bolster up his case with several chapters containing assumption, factual error, and wishful thinking which those with a little knowledge are likely to accept as anatomy, physiology, and other medical sciences. Moreover, the inclusion of such matter makes it appear unreasonable for the author to complain if scientists point out that these particular foundations for his views are unsound.

Dr. Dick Read protests that his critics have never tried his methods, and this despite the fact that it is claimed that the sales of this book (translated into several languages) already exceed a quarter of a million. Indeed, many obstetricians are becoming concerned that hospital and other authorities are already going to much trouble and expense to initiate special clinics for the practice of natural childbirth methods, when all the scientific evidence so far available shows that such methods make no significant difference to the duration and pain of labour or to the incidence of complications in labour, even though they may give the women some comfort of mind during pregnancy. Those who are less sceptical will find that the most valuable section of this book is the one in which antenatal and relaxation exercises are described and illustrated.

Among the many quotations from varied sources which the author gives, sometimes out of their context, is one from Marcus Aurelius Antoninus: "Cast away opinion; thou art saved."

T. N. A. JEFFCOATE.

FLUID AND ELECTROLYTE THERAPY

Fluid and Electrolyte Therapy. By Franklin L. Ashley, B.S., M.S., M.D., and Horace G. Love, B.S., M.D. (Pp. 72. 24s.) London, Philadelphia, Montreal: J. B. Lippincott Company. 1954.

In principle a small book on fluid and electrolyte therapy, with at least one of the authors a practising surgeon, is to be welcomed; in practice, however, this book is frankly disappointing. The authors' object, as set out in the preface, is "to present in this primer, in simple form, some of the more fundamental principles of this basic subject for all branches of medicine and surgery." The important principles are in fact obscured, partly by bad arrangement and partly by turgid writing. As an example of bad arrangement, the paragraph on "function of the kidneys in the maintenance of electroneutrality in the extracellular fluid" (p. 12) is mainly devoted to water and solute excretion, and there is no mention of cation exchange or excretion of titratable acid. As regards detailed expression, there are many sentences like this: "Nitrogen retention occurs in large fluid losses when an insufficient quantity of water

remains in the large bowel to excrete solid waste products" (p. 11); or this: "When the amount of acid in the ECF reaches the bounds of the urinary acid . . ." (p. 13). It is often difficult to be sure whether the authors themselves have grasped the information which they are attempting to convey. If there is any truth in Boileau's dictum, "Qui se conçoit clairement, s'expresse clairement," the presumption is that they have not. At times common sense breaks through, as on page 57: "In calculating the ECF fluid replacement when over 30% of the body surface is burned, the calculations should be based on 30%; otherwise the volume would be impossible." There is a good index, but it deserves a better book.

D. A. K. BLACK.

METABOLISM OF PROTEIN

Protein Metabolism. By R. B. Fisher, B.Sc., M.A., D.Phil. (Pp. 198. 11s. 6d.) London: Methuen and Co., Ltd. New York: John Wiley and Sons, Inc. 1954.

This pocket-sized book deals lucidly with the digestion and absorption of protein; the overall picture of protein metabolism; deamination, transamination, and urea synthesis; general aspects of the metabolism of amino-acids; the use of isotopes in the study of protein metabolism; metabolic and endocrine interactions in protein metabolism; and, finally, on the nutritive value of proteins.

The author has attempted and achieved what is more truly a "re-view" than a sequence of discoveries. He finds, for example, that "there is little evidence for the necessity for peptic digestion and little certainty of the occurrence of 'ereptic' digestion of proteins, but tryptic digestion seems essential to normal protein absorption." The evidence that the products of the digestion are amino-acids and that protein passes into the blood stream in this form he considers is incomplete and at variance with the time taken for complete digestion of protein. Evidence for the chemical form of the products of protein absorption is believed to be unreliable. That is surely a sufficiently stimulating and thought-provoking assessment of the evidence to make the reader continue!

The problem of the form of the normal products of absorption is therefore held to be very important, because it determines the course of investigation into the details of protein metabolism. It is suggested that there is enough evidence to consider seriously the possibility that peptides rather than amino-acids are the normal currency of protein metabolism. The general interpretation adopted is that synthetic processes, mainly those leading to cytoplasmic protein synthesis, are the immediate fate of the products of absorption of protein in the body. The author's special contribution is the emphasis on the incompatibility of this interpretation with the notion that the major processes of protein metabolism can be profitably studied by investigating the fate in the organism of individual amino-acids. The metabolism of protein is the metabolism of the amino-acids in concert. He holds that there must be a series of intermediate molecules of great importance, which must fall into the category of neglected peptides.

D. P. CUTHBERTSON.

ELECTROCARDIOGRAPHY

Practical Electrocardiography. By Henry J. L. Marriott, M.D. Illustrated by Maicie Ethridge Perry. (Pp. 171+xi; 115 illustrations. 38s. 6d.) Baltimore: Williams and Wilkins Co.; London: Baillière, Tindall and Cox. 1954.

In *Practical Electrocardiography* Dr. Marriott aims at emphasizing the simple aspects of the subject rather than the difficult and giving full illustration of the usual types. On the whole the result is a success, for the book is commendably short compared with some of the large texts on the subject that appear nowadays. Whether such brevity really does achieve true simplicity is at times doubtful; there are some places where fuller explanation is wanted. It is a little odd to see on Figure I the triangle, presumably of Einthoven, represented as being right-angled with lead II as the hypotenuse. If the author had made more than a passing reference to Einthoven's law he would have got into serious geometrical difficulties on this basis. The detailed description of the unipolar limb leads comes at the end and gets only five pages of print; this should come at the beginning and lead up to the bipolar and receive more space. On page 130 "Lead 2" should read "Lead 1." One wonders what the statement "the changes in the precordial leads are exaggeration of the changes in Lead 1" really means. Figure III will probably confuse the reader, for the "vertical heart" is depicted in the same plane as the horizontal. Probably the chapter on disorders of rhythm is the best, where the discussion of the auricular disturbance is well done.

TERENCE EAST.

LOOKING BACK

Goodbye, Harley Street. By R. Scott Stevenson. (Pp. 224; illustrated. 15s.) London: Christopher Johnson. 1954.

The author of this readable book has left Harley Street in order to settle in Gibraltar, where there appears to be need for the services of a specialist in diseases of the ear, nose, and throat, and where, incidentally, he will be free from the restrictions of the National Health Service. He seems, however, to have a few nostalgic thoughts of the homeland, for in his new and delectable surroundings he has been induced to write another series of reminiscences. He comments on many subjects: his early experiences in medicine and journalism; his travels in America; his views on art; the struggle with the Ministry over the Metropolitan Ear, Nose, and Throat Hospital; the increased amenities for the deaf, in obtaining which he played so large a part; and the National Health Service.

There are in addition thumbnail biographies of many famous people whom the author has met during his varied career. In his early days he met a doctor who told him that he had built up his large practice by "being polite to maid-servants," for the attention to the maid induced the mistress to call him in. At another place where he was resident his colleague told him that most doctors married a nurse, a barmaid, a medical student, or a doctor's daughter because they were "the only women a poor blighter of a medico ever meets." We liked the story of the distinguished Duke who, not being able to obtain either a towel or a tumbler while travelling in a sleeper to the North, complained bitterly. "But," he added, "when I got to Glasgow I paid 'em back, for I pinched the soap."

In looking back over his life-work Scott Stevenson writes as the last words in his book: "Yes, I have indeed enjoyed it all." We think the reader will probably say the same of this book, but he will probably dissent from many of the free and frank criticisms contained therein.

ZACHARY COPE.

ORAL AND DENTAL DISEASES

Oral and Dental Diseases: Aetiology, Histopathology, Clinical Features and Treatment. A Textbook for Dental Students and a Reference Book for Dental and Medical Practitioners. By Hubert H. Stones, M.D., M.D.S., F.D.S. R.C.S. Third edition. (Pp. 1,019+xix; 965 illustrations, 91 in colour. £5.) Edinburgh and London: E. and S. Livingstone. 1954.

This is the third edition of what has now become accepted as the classic English work on this subject. The whole book has been revised and the chapter on diseases of the nervous system and muscles rewritten. Further references have been added, and illustrations changed where better ones were available. It is an excellent book, of great value to the student, and, owing to the fullness of the references, invaluable to the postgraduate who requires further information on any particular aspect of a subject. The only disadvantage from the student's point of view is the price, but it is unfortunately impossible to produce a book covering the subject so admirably, and so well illustrated, at anything less.

It is certain that this edition will have the same success as its predecessors.

ALEXANDER MACGREGOR.

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ABUSE OF BARBITURATES

The sinister potentialities of the barbiturate hypnotics have been a perennial subject of debate in the medical press for the past thirty years. The topic has a fascination for the lay public that has survived the challenge of such potent new drugs as penicillin and cortisone. The danger of acute barbiturate poisoning, accidental or suicidal, is common knowledge. The hazard of chronic barbiturate intoxication, on the other hand, is less widely appreciated, despite a number of recent publications on the subject. In this country R. A. Hunter and H. P. Greenberg[1] have reported three cases of habitual abuse of the short-acting barbiturates quinalbarbitone and amylobarbitone, and have added the syndrome of hyperinsulinism to the already long list of conditions which may be mimicked by prolonged overdosage with these drugs. They rightly point out that it is no longer possible to deny the existence of a state of dependence on barbiturate hypnotics which fulfils all the criteria for addiction laid down by the World Health Organization,[2 3] with the possible exception of "a tendency to increase the dose," which is slight when compared with the behaviour of morphine addicts. There is no reliable information on how commonly barbiturate addiction occurs. The fact that two of the three patients described by Hunter and Greenberg had ready access to dangerous drugs makes it possible to hope that this deplorable state is rare among the general population. Isbell and Fraser[4] have made the alarming statement that addiction to barbiturates is "far more dangerous and harmful" than morphine addiction, and that the condition is becoming commoner in the U.S.A.

Since 1950 Isbell and his colleagues at the United States Public Health Service Addiction Research Center in Lexington, Kentucky, have produced a series of papers on chronic barbiturate intoxication.[5-9] Their considerable experience of the condition has been gained by methods which would not be countenanced in Britain. These workers subjected nineteen patients, all of whom are described as being addicted to opiates and the majority to barbiturates as well, to the prolonged administration of quinalbarbitone, pentobarbitone, or amylobarbitone, in doses varying between 1 g. and 3 g. a day. They noted that the intoxication produced by overdosage with these drugs closely resembled acute alcoholism, and described the abstinence syndrome, essentially a combination of delirium tremens and grand mal convulsive attacks, which followed sudden withdrawal of the drug. Fraser and Isbell[9] admit that the alarming abstinence syndrome occurs only if the patient has habitually taken more than 0.9 g. a day of one of the barbiturates. In the only recorded case of death following withdrawal[10] the patient had taken 5 g. of quinalbarbitone daily for several months. Kalinowsky[11] reported the occurrence of convulsions in seven patients, all of whom had been treated with at least 1.3 g. of sodium barbitone a day for "months or years," when an accident temporarily cut off the supply of the drug to the hospital.

Repeated denunciation of the excessive use of the barbiturate drugs has had little effect on the rate at which they are prescribed. Dunlop, Inch, and Paul[12] found that these drugs accounted for 10% of the prescriptions issued on form E.C.10 during a single month in Scotland in 1951. There is no reason to suppose that the proportion is lower now than it was three years ago; it may well be nearer 15%. Though we lack even a rudimentary knowledge of the function of sleep and of the number of hours of sleep required either to maintain health or to recover from bodily and mental illness, no doctor can fail to have been impressed by the therapeutic value of a good night's sleep for patients suffering from cardiac failure, acute infections, or endogenous depression; and few will contest the propriety of giving a hypnotic, for a few nights at least, should nature be unaccommodating. What is much more controversial is the practice of "sedating," during waking, and often working, hours, people whose symptoms are the result of anxiety and frustration, and those suffering from what it is now fashionable to call psychosomatic disorders. Of the barbiturate group of drugs those whose duration of action is limited to six or eight hours (quinalbarbitone, pentobarbitone, cyclobarbitone) are appropriately used for inducing sleep, while "sedation" calls for the use of phenobarbitone. Nevertheless the prescriptions issued for phenobarbitone are between two and three times more numerous than those for the short-acting barbiturates, so that it would appear that the bulk of any excessive prescribing of barbiturates is accounted for by phenobarbitone. It is some consolation to know that phenobarbitone is less apt than any other member of the barbiturate group to cause addiction.

[1] *Lancet*, 1954, **2**, 58.
[2] *Wld Hlth Org. techn. Rep. Ser.*, 1950, No. 21, 7.
[3] Ibid., 1952, No. 57, 9.
[4] *Pharmacol. Rev.*, 1950, **2**, 355.
[5] *Arch. Neurol. Psychiat. (Chicago)*, 1950, **64**, 1.
[6] *Ann. intern. Med.*, 1950, **33**, 108.
[7] *Arch. Neurol. Psychiat. (Chicago)*, 1953, **70**, 180.
[8] *Amer. J. Med.*, 1953, **14**, 558.
[9] *Arch. intern. Med.*, 1954, **94**, 34.
[10] Fraser, H. F., *et al.*, *Ann. intern. Med.*, 1953, **38**, 1319.
[11] *Arch. Neurol. Psychiat.*, 1942, **48**, 946.
[12] *British Medical Journal*, 1953, **1**, 694.

BRAIN INJURY IN BOXING

While many of the athletic activities of young men are associated with risk of injury, and rarely of death, their value in developing physical fitness and character more than justifies the risk involved. Boxing is unique among the sports of civilized communities in that the object of the boxer is not only to hurt his opponent, but if possible to render him unconscious. This has led to differences of opinion on the merits of boxing as a sport and a spectacle. A study of the frequency, severity, and types of injury occurring in the ring is valuable in permitting an assessment of the risks involved as well as indicating how these can be minimized. The article by Drs. J. L. Blonstein and E. Clarke in the present issue (p. 1523), as well as those of Kaplan and Browder[1] and of Larsson and his colleagues,[2] are helpful in this connexion.

While injuries to the face, teeth, and hands are common, the most serious is head injury. This is to be expected, since the head is the most important target and knock-outs are usually achieved by head blows producing cerebral concussion. Concussion is regarded as a disturbance of brain function without anatomical change and appears to be particularly transient when resulting from a head blow in the ring. Nevertheless out of 24 amateur boxers investigated electroencephalographically by Blonstein and Clarke after being knocked out, 16% showed a diffuse slowing of rhythm; and in one boxer who had been concussed on four occasions the abnormality persisted for two months. Abnormalities of this duration suggest organic brain damage. Larsson and his colleagues record that 36 out of 75 amateur boxers showed either clinical signs of brain injury, E.E.G. changes, or both. When E.E.G. records were taken both before and after a fight, these workers found abnormalities in 13% of all the boxers examined in this way and in 30% of those who were knocked out, knocked down, or who lost on technical knock-outs owing to hard head blows. Kaplan and Browder, whose investigation was confined to professional boxers, state that electroencephalography failed to give statistically significant results, except for the fact that the highest proportion of disorganized E.E.G. records was found among the individuals with the lowest ring ratings (who doubtless lost more fights). It would seem, too, that these authors regard many different types of record as coming within the range of normal, and of the twelve varieties of E.E.G. record they regard as normal some would consider more than 50% abnormal. Useful information could be obtained by further electroencephalographic study—records being taken at the beginning of each boxer's career and at intervals while he continued to box.

Since trivial head injuries which produce no concussion may at times be followed by subdural haemorrhage it is not surprising that intracranial bleeding, often with fatal results, occurs as a result of boxing injuries. Blonstein and Clarke record six fatalities from this cause, but make no reference to any cases of intracranial haemorrhage treated successfully after a boxing injury. Kaplan and Browder have seen five brains at necropsies on boxers in the New York district over a period of 25 years and consider that in every case the death was due to cerebral contusions and lacerations in the fronto-temporal regions as a result of a fall on to the occiput resulting from concussion. They too make no mention of any cases of intracranial haemorrhage treated successfully by surgery—though such cases undoubtedly occur, and it would be useful to know what proportion of knocked-out boxers are sent to hospital because of evidence that the injury is more serious than a mild cerebral concussion.

While little is known of the pathology of the punch-drunk state, Blonstein and Clarke think it most unlikely to occur in amateur boxers, and the American authors dismiss views which have been put forward about its pathology without substituting an alternative hypothesis or discussing their own experience of the state. But there is no doubt that deterioration of personality and intellect can occur as a result of a career in the ring, and it seems likely that it is due to repeated head injury.[3,4] Further study of such cases might make it easier to recognize the early stages of deterioration. In professional bouts in New York the prevention of lasting brain damage is attempted by the use of larger boxing gloves, the placing of a rubber mat beneath the ring canvas, careful matching of contestants, and a mandatory count of eight after a knock down. Further, a persisting E.E.G. abnormality in a boxer leads to withdrawal of his licence, while his history, performance, and physical condition are also reviewed in assessing his fitness to continue to fight.

It is disquieting to read of such a fatality as recently occurred in London when a young professional boxer collapsed after a fight and died after a cranial operation. If boxing is to remain high in public esteem as a sport—and a Parliamentary debate[5] last year showed that opinion was sharply divided—it is essential that the authorities which control both amateur and professional contests should act on the recommendations given by their medical advisers in order to minimize the risks of brain injury. And every medical officer at boxing contests should be familiar with the early signs of cerebral damage, and should insist on adequate time for full examination.

[1] *J. Amer. med. Ass.*, 1954, **156**, 1118
[2] *Acta psychiat. neurol. scand.*, 1954, Supplement 95.
[3] Carroll, E. J., *Amer. J. med. Sci.*, 1936, **91**, 706
[4] Critchley, M., *Medical Annual*, 1937, 318.
[5] *Hansard*, May 20, 1953, col. 2204.

THE HANDICAPPED ADOLESCENT

When children who are mentally subnormal develop an additional physical disorder their adequate treatment and control becomes a matter of great difficulty. The problem is commonly posed in epilepsy, for it is often associated with an intelligence which is defective in varying degree. For the low-grade defective epileptic certification and permanent institutional care supply a solution, but for the dull, the educationally subnormal, epileptic the ideal school, whether residential or day, is difficult to find. The problem lies not so much in the control of the epilepsy as in the social consequences of the disease. With the dull diabetic child a different set of problems arises, for diabetes is a disease in which, more than any other physical disorder, a disciplined way of life is an essential therapeutic requirement. This is easily achieved in the intelligent child bred in a good home, but even there it demands co-operative parents and continued care by an interested and instructed doctor.

The problems of the difficult diabetic in childhood and adolescence were admirably discussed by Dr. Joan Walker[1] at the Annual Scientific Meeting of the British Diabetic Association. Medical officer in charge of the diabetic department of the Leicester Royal Infirmary, she has also supervised a small unit of twenty beds for diabetic boys and men at Burley, near Oakham. Here difficult diabetics have been accepted for prolonged periods of training. Burley unfortunately is soon to be closed.

She states that in the last five years she has met twenty-two unusually difficult young diabetics; ten of them came from Leicester and twelve from other centres. In all of them the problems were the result of low intelligence or of psychological deviations. The several case histories which she relates illustrate well the wayward careers of these unfortunates. Up to the age of 16 years the difficulties may be great, but they should not be insoluble. The mental defectives can be certified and the subnormal and difficult children whose homes are inadequate can be accommodated in hostels for diabetic children, subject to their parents' consent. The real problems emerge when a diabetic of 16 years has not yet learnt to manage his disease. Dr. Walker divides these difficult adolescents into three main groups—the mentally retarded, the delinquent, and the psychologically unstable—and any one child may have to be classified in all groups. For example, Arthur, who developed diabetes at the age of 9, lived in a bad home. His low intelligence was not recognzed until he was 13, when he had required admission to hospital on several occasions for treatment of diabetic coma. In the succeeding five years a residential hostel for diabetic boys, a Government training centre, a working boys' hostel, and the Burley convalescent hospital have united to do their best for him, but all have failed because his sense of responsibility was too deficient to ensure even a moderate standard of therapeutic control. The psychologically unstable group included four adolescents who repeatedly induced hypoglycaemia in themselves in order to escape from difficult situations.

The size of the problem should not be exaggerated; it cannot concern large numbers of children. If diabetes affects one in every 2,000 children, and if the incidence of these difficulties in them is as high as 2–5%, there may be no more than 30–40 diabetic adolescents in the country at any one time whose problems defy solution by any available organization. Dr. Walker suggests that one hostel for retarded diabetic youths might meet the need, and she has certainly demonstrated a case which justifies examination by the Home Office and by the British Diabetic Association.

There are, however, some wider aspects of this problem which illustrate possible defects in our existing organization. Arthur had been a diabetic for four years before his low intelligence was recognized. The paediatrician knows much about mental deficiency and abnormal behaviour in children, but he may have little experience of, or interest in, diabetes. The physician trained in diabetes is expert and interested in his subject, but he may have little knowledge of the recognition and handling of mental defect and psychological instability. Quite a good indication of intelligence and stability is provided by the age at which the child will give his own injections of insulin. A quick and sensible child will manage it at 7 years, and an average child becomes expert at 9 or 10. The failure to achieve this minimal degree of therapeutic responsibility at 12 years should "alert" (as our American colleagues say) the attending physician to ensure that the three remaining school years must be used to the child's best advantage. Children who suffer conjointly from mental or psychological retardation and a chronic physical defect, such as diabetes, epilepsy, bronchiectasis, or heart disease, remind us again—and how difficult the lesson is to remember—that physicians must never allow themselves to become experts of limited vision.

There is a further conclusion which is implicit in Dr. Walker's paper; there may in fact be some medical neglect of the problems of the adolescent. Here the social and industrial services cannot be blamed, for much thought and money have been expended by Government departments and by religious and social organizations to ensure that this crucial stage of development is adequately protected and

[1] *Med. Offr*, 1954, **92**, 151.

wisely directed. Corresponding attention is not always paid by our medical services to the late teen-agers. The child finally emerges from the children's out-patient department at 15 years. He has reached an age of independence and no longer requires the paediatrician's paternal care. Who is to keep a friendly eye on him until he achieves maturity? The family doctor always, and the hospital physician and specialist sometimes, are essential guardians of the adolescent's future. There is a responsibility on the paediatrician to ensure that the necessary links between them and himself are soundly forged.

"WORKING-UP TO A FIT"

The relations of many epileptics, and all chronic mental hospital nurses, know that some epileptic patients show changes in mood and behaviour for hours or days preceding typical attacks. Some of the phenomena are clearly the result of localized epileptic discharges—for example, myoclonic jerks or sensory auras of all kinds. Other phenomena appear to be exciting factors, the causes rather than the results of epileptic activity. Experimental studies show that the abnormal state of excitation that is epilepsy can be reached by the adding together of sensory stimuli under certain conditions. The most notable examples of such phenomena are the effects of flickering light, with or without leptazol, that were the subject of a recent annotation.[1] It is perhaps not going too far to assert now that epilepsy is not only always focal in origin, as Hughlings Jackson thought, but also that all epilepsy is reflex epilepsy, in the sense that variations in the sensory influx finally determine the moment of onset of the epileptic fit. Even so, it is not possible fully to understand in these terms the emotional changes preceding and often obviously precipitating fits. Long ago Gowers thought that 50% of fits were precipitated by emotion. Musicogenic epilepsy,[2] mentioned by Dr. E. C. O. Jewesbury in his article at p. 1518, is well known, and many patients come to recognize other "stresses" precipitating fits. They have reflex epilepsy in a sense, but the significant qualities of the stimuli are not the sensory qualities (brightness, flicker frequency, and so on) but their emotional significance, though how this can be measured is a so far insoluble problem. It is also interesting that the epileptic foci in these cases are usually, if not invariably, in the deeper parts of the temporal lobe, the area of the brain that seems so closely concerned, physiologically, with normal emotional expression. The particular emotional stresses are as strictly unique for each patient as a key is to a lock.

But the psychological peculiarities go even further, since some patients actually seek out these stimuli. One of the oddest was found by Hill and his colleagues[3] in a man who deliberately sought safety pins because they gave him not only an epileptic fit, originating in the temporal lobe, but also a certain gratifying emotional experience he called "mind satisfaction" that was obviously sexual in character. Elsewhere in this issue (p. 1520) Dr. D. A. Pond and Miss B. Bidwell discuss behaviour disorders in epileptic children, and they, as well as other workers,[4 5] have noted a deliberate seeking of experiences that lead to fits in a few patients with petit mal and the other form of epilepsy besides temporal lobe epilepsy that is frequently precipitated by emotion. In these cases the epileptic attack seems to have the effect of discharging tension, both psychological and physiological, and the specific triggers are comparable to those normal stimuli which stimulate sexual excitement and discharge. Other disorders besides epilepsy can serve similar ends. Cataplexy provides a good example, as Levin[6] and Pond[7] have noted. Loss of muscle tone can occur not only with laughter ("geloplegia") but also, for example, on attempting winning shots at a game. All these cases help to elucidate the paradox of a pathological symptom which is or has become of psychological significance and importance. Furthermore, symptoms of this sort are often very resistant to treatment, and in this they resemble some of the symptoms which have been observed in so-called animal neuroses. Several experimenters have commented on the extraordinary fixity of conditioned reactions that have caused "symptoms" in an animal, compared with the easy extinction of other responses. Neurophysiological phenomena in general are still too atomistically regarded and not considered also as possible expressions of the instincts or drives of the organism.

[1] *British Medical Journal*, 1954, **1**, 925.
[2] Shaw, D., and Hill, D., *J. Neurol. Neurosurg. Psychiat.*, 1947, **10**, 107.
[3] *Lancet*, 1954, **2**, 626.
[4] Bickford, R. G., Daly, D., and Keith, H. M. *Amer. J. Dis. Child.*, 1953, **86**, 170.
[5] Robertson, E. G., *Brain*, 1954, **77**, 232.
[6] *J. nerv. ment. Dis.*, 1950, **111**, 101.
[7] *J. ment. Sci.*, 1952, **98**, 38.

CHELATING AGENTS IN RADIOGRAPHY

Last year we forecast[1] that chelating agents—substances which form stable complexes with metals—would find many uses in medicine. A recent application comes from South Africa, where Sapeika[2] has had the ingenious idea of using a complex of lead and ethylenediamine tetraacetic acid (E.D.T.A.) as a contrast medium in diagnostic radiology. So far the method has been used only in animals, but excellent films have been obtained after both oral and parenteral administration. Much careful work will be necessary to ensure that the substance is non-toxic before it can be used in man, but previous experience with chelating agents suggests that the complex once formed is very stable and is rapidly and completely excreted.[3] If this is true for pre-formed lead E.D.T.A., its great value would be in pyelography and angiography, where iodine-containing compounds still produce unpleasant side-effects and even severe toxic reactions. Sapeika has also been able to visualize the liver after parenteral injection, a feat which is impossible with present contrast media. The high atomic weight of lead implies that films of high contrast could be obtained, and a dense medium of this type, if innocuous, would be a great advance in radiography.

[1] *British Medical Journal*, 1953, **2**, 1365.
[2] *S. Afr. med. J.*, 1954, **28**, 759.
[3] Sidbury, J. B., jun., Bynum, J. C., and Fetz, L. L., *Proc. Soc. exp. Biol., N.Y.*, 1953, **82**, 226.

TRAINING FOR THE TROPICS

The introduction of effective vaccination and other prophylactic measures has provided means of preventing malaria, blackwater fever, and yellow fever, which were the major killing diseases in the Tropics. Countries once known as the white man's grave have thus been turned into healthy regions. On every side investigation into the prevention and treatment of tropical disease proceeds at an amazing rate and with notably fruitful results.

Much of the research which has led to these results has stemmed from Britain, from its schools of tropical medicine and from the men and women trained in these schools. This fact is being increasingly recognized by the governments of foreign tropical countries, which are sending their doctors here in ever-increasing numbers to study for diplomas in tropical medicine and hygiene. The courses for these diplomas provide comprehensive training in the principles and practice of tropical medicine. Students studying for the recently introduced University of London academic postgraduate diploma receive training in research methods and in tropical medicine and hygiene at an advanced level.

In spite of political changes opportunities for British doctors to work in self-governing members of the Commonwealth remain and may become more numerous in the future. Posts are also available in H.M. Overseas Civil Service and in universities in the Commonwealth. Those swelling the ranks of the hospital registrars might sometimes find more satisfying work in these posts than in those they at present occupy or in those they may ultimately obtain in this country. Moreover, the Ministry of Health has introduced a scheme providing for continuity of superannuation rights and benefits for those who proceed overseas in the Overseas Civil Service on short contracts.

One thing, however, is clear: if good work is to be done in the Tropics, special training in tropical medicine is necessary. A doctor cannot give his best while lacking in basic knowledge of diseases with which he is confronted, and to acquire this knowledge by practice overseas is a long and for the patient dangerous process. Moreover, those whose minds are not trained in their subject are usually incapable of grasping the full significance of phenomena confronting them; opportunities for making important observations may thus be lost. Clearly, too, those who possess these extra qualifications and who therefore are trained to give better service should receive recognition in the form of salary increments and seniority from their employers, be these the Colonial Governments or other bodies.

It is to be hoped that members of the medical profession in Britain will come forward in increased numbers to use these opportunities awaiting them in the Tropics and that their prospective employers will not overlook the need for providing them with the financial assistance necessary to enable them to obtain additional training in tropical medicine. This training should be done before proceeding overseas. The responsibility for ensuring that it is undertaken should primarily be with the employer; the days have passed when a young man can provide for several months of whole-time study out of his own pocket. A little money spent in this way is well invested; and, after all, unlike employers in America, India, and South-east Asia who send their doctors here, those in Britain do not have to finance a journey of several thousand miles. The schools are here, and their doors are open.

MOTOR-CYCLE DEATHS

The protection conferred by crash helmets on motor-cycle riders and passengers was first emphasized by Cairns, whose influential paper on the subject appeared in this *Journal* in 1941.[1] As a result of his investigations the armed Forces made the wearing of crash helmets compulsory for their motor-cycle riders, and the proportion of fatal to non-fatal accidents fell notably in consequence. The value of this single measure in lowering mortality was endorsed by the Committee on Road Safety in 1947,[2] the Road Research Laboratory in 1949,[3] and again by the Committee on Road Safety in 1952.[4] And Cairns himself concluded,[5] after reviewing his experience of these accidental injuries throughout the war: "There can be little doubt that adoption of a crash helmet as standard wear by all civilian motor-cyclists would result in considerable saving of life, working time, and the time of the hospitals." No wonder, therefore, that when motor-cyclists learnt of this war-time work, and of the wholly favourable opinions expressed about crash helmets, many bought them not only for themselves but for their pillion-passengers also. Even so, too many are still to be seen not wearing them, and the B.M.A. has a strong case in seeking, as it now is from Government representatives, for removal of the purchase tax as an added inducement. On humane considerations it is unanswerable, for the revenue obtained from it can only be trivial, while sales at least would not fall and might surely be expected to rise. Crash helmets range in price from 47s. 6d. to 65s. Purchase tax is 25% of the basic price—that is, one-fifth of the selling price—so that they would sell for 10s. to 13s. cheaper without it. This is an attractive reduction for the relatively impecunious young men who are the chief purchasers.

In England and Wales in 1953 there were 4,246 road traffic fatalities.[6] Of these, 1,135 were the deaths of motor-cycle riders or passengers—that is, about one-quarter—and most of them were of men aged 18–35. The proportion is not quite so high in Scotland, where in the same year there were 86 deaths of motor-cyclists out of 563 total road deaths.[7] Martin has shown[8] that in the 'thirties accidental deaths, to which motor-cycle

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[1] *British Medical Journal*, 1941, **2**, 465.
[2] *Final Report of the Committee on Road Safety*, 1947, H.M.S.O., London.
[3] *Accidents Resulting in Injuries to Army Motor Cyclists*, Road Research Technical Paper No. 13 based on Operational Research Group (W. and E.) Report No. 358, 1949, H.M.S.O., London.
[4] Committee on Road Safety. *Report to the Minister of Transport on Motor Cycle Accidents*, 1952, H.M.S.O., London.
[5] *British Medical Journal*, 1946, **2**, 322.
[6] *The Registrar-General's Statistical Review of England and Wales for the Year 1953*, Tables, Part I, Medical, 1954, H.M.S.O., London.
[7] *Ninety-Ninth Annual Report of the Registrar-General for Scotland, 1953*, 1954, H.M.S.O., Edinburgh.
[8] *J. Hyg. (Lond.)*, 1935, **35**, 375.

accidents chiefly contributed, caused an indentation in the curve of the probability of dying from all causes, for males, between the ages of 24 and 28—an indentation peculiar to England and Wales and not found on the Continent. These deaths are a no less serious contribution to the general mortality rate to-day. The Government's new Road Traffic Bill, recently introduced into the House of Lords, is expected to be one of the principal legislative measures this session, and its appearance suggests the time is ripe to consider the removal of purchase tax from crash helmets as well as other action to help reduce the risk to life and limb on the roads.

THE BURST ABDOMEN

The result of an apparently successful laparotomy may be marred by that distressing complication, disruption of the abdominal wound. A recent analysis of 113 cases of abdominal wound disruption occurring among 22,311 major abdominal operations gave an incidence of 0.5%.[1] The causes of this disaster are still imperfectly known.

That this complication occurs in debilitated patients, in whom there is evidence of malnutrition, is well known, but it is uncertain whether this will account for more than 20% of the cases. Tweedie and Long[1] found that 75% of the patients in their series exhibited symptoms of cough, vomiting, and distension, either singly or in combination, to an excessive degree. Increased intra-abdominal tension may be the most important aetiological factor, as is indicated by a report from the Wadsworth Veterans' Hospital, Los Angeles.[2] At this hospital, which accepts many patients with intestinal obstruction, the incidence of disruption was 5.8%.

Opinion varies on the technical details which will guard against the disruption of wounds. The complication is less frequent after a transverse than a vertical incision.[2] Suture material is relatively unimportant, but there is no doubt that careful closure of the wound is paramount. Retention sutures are believed by many to be effective, but for them to be so they must be placed as closely together as the sutures approximating the fascial layers. A few tension sutures widely spaced are of little value. The almost certain regularity with which a resutured abdominal wound heals has led to the suggestion that wounds produce a specific factor that promotes healing. Savlov and Dunphy[3] have re-investigated this problem experimentally in abdominal wounds of rats. The tensile strength of the abdominal wound was tested on the third day. An abdominal wound made fifteen days after a preliminary wound on the animal's back did not show any greater tensile strength than in the control group. However, fifteen-day-old abdominal wounds that were opened and resutured showed a significant increase in tensile strength on the third day after resuture. These experiments indicate that one wound does not exert a favourable effect upon another, but that a resutured wound heals more rapidly than a primary wound. This increased acquisition of strength in the resutured wound is due to the proliferation of the fibroblasts which has already occurred. In a primary wound there is a lag period of three to five days for the processes of repair to get under way.

Further studies on the problem of the burst abdomen are needed, but it is important that they should be adequately controlled. The main factors to be considered in such an investigation have been enumerated by Marsh and his collaborators,[2] who suggest as the first criterion of success for such an investigation: "Start the series at the beginning, keeping the purpose constantly in mind and enforcing controls rigidly." At the present time the main approaches to the prevention of this complication, apart from careful operative technique, should be the pre-operative recognition of malnutrition and the control of abdominal distension.

[1] Tweedie, F. J., and Long R. C., *Surg. Gynec. Obstet.*, 1954, **99**, 41.
[2] Marsh, R. L., *et al.*, *J. Amer. med. Ass.*, 1954, **155**, 1197.
[3] *New Engl. J. Med.*, 1954, **250**, 1062.

REPRINTS

Just as some methodical people keep Christmas card lists, so some research workers keep reprint lists—and not only research workers. Many a communicative physician or surgeon has a considerable list of friends, colleagues, and other workers who share his interests, a list changing from time to time as his attention turns from one topic to another, but a list of people always gratified to receive a printed record of their colleague's latest work. These fortunate recipients may be counted as well deserving of what is sometimes quite an expensive product—indeed, so expensive nowadays as occasionally to come near the price of the whole journal in which the paper appeared. But there are other recipients, or at least suppliants, about whom some misgivings may be felt. These are the people, usually quite unknown to the author, who send him a printed or mimeographed postcard, with most of the request for his reprint already mechanically mass-produced on the card and only the title of his paper written in (or typed) to indicate any personal interest in it. Rightly castigating such discourtesy, Mr. Joel W. Hedgpeth,[1] of the Scripps Institution of Oceanography, California, has recently written:

> "I have seen some of the postcard operators in action. Like the people who use their auto horns for doorbells, they belong to a group whose acquaintance I hesitate to admit. They sit at the new journal table in the library with little stacks of postcards, and go through the current journals filling in the blank spaces on their request cards. They hardly pause to read more than the title of a paper."

He goes on to pillory the request, made with the sanction of an institution, usually a library, which asks not for one reprint but for two, one of them being for the library. He might have added the even more offensive demand, noted occasionally, of a library asking the author not merely for a reprint but in addition for an abstract of his paper—to be prepared by the author—even specifying a length of up to so many words. In any case a cantankerous author might well wonder why he should supply libraries, at some expense to himself, with material that they, and ultimately their subscribers who use it, ought to pay for in an ordinary commercial transaction.

[1] *Amer. Sci.*, 1954, **42**, 497.

A COMMONWEALTH TOUR

BY

A. LAWRENCE ABEL, M.S., F.R.C.S.

One of the four teaching hospitals of Sydney—the Royal North Shore—holds an annual reunion week. This is organized by the 45 members of the resident staff, under the general supervision of Dr. Wallace Freeborn, the medical superintendent. The custom is to invite someone from overseas, Britain or North America, to be the Guest Professor, to undertake most of the clinical demonstrations, conferences, lectures, and, if he be a surgeon, several operating sessions. About a year ago I was honoured by being invited to be the Guest Professor for 1954.

While my programme was being arranged two further invitations were received. One was by the Board of Governors of the Royal Cancer Hospital, which decided to send several members of the staff to attend the Sixth International Cancer Conference at São Paulo, Brazil, two weeks before the Australian meeting. The other was to attend the Annual Conference of the Royal Australasian College of Surgeons in Melbourne a week later. Both of these I accepted.

Preparations

One of the more agreeable ways to reach Brazil appeared to be to cross the Atlantic to New York, and thence continue by air. When some Canadian friends heard that I was to be as near as New York, they asked me to break my journey and to speak and to operate in the Toronto East General Hospital, so I left Southampton in the *Queen Elizabeth* on July 8, on the first stage of my 35,000-mile journey, with a busy schedule ahead. This journey would take me through many changes of climate, and not only did I have to consider my wardrobe, but, as the remainder had to be undertaken by air, the weight of my luggage was a problem.

Thanks to the genial co-operation of Dr. Peter Hansell, the presiding genius of the Department of Medical Photography at Westminster Hospital Medical School, and to Miss Hunt, head of a similar department at the Royal Cancer Hospital, about 250 glass lantern slides had been converted into light-weight 35-mm. slides, more easily transportable in my subsequent air trips. Even so, these, together with notes and script of 35 talks and lectures, weighed 9 lb., a large proportion of the 66 lb. allowable on a round-the-world air ticket.

In addition, I had, of course, to take clothing suitable for a dull cold Transatlantic crossing, for the stifling heat of New York and Toronto, and for subsequent sojourns in the conditions prevailing on and near the Equator, and also enough to equip me for the, to me unknown, weather conditions of winter in Brazil, Sydney, and Melbourne. I had, too, to take a dinner-jacket and tails, and college gown, so the remainder of the 66 lb. did not allow an extensive wardrobe; but one soon learns the advantage of washing one nylon shirt and collar, one set of nylon under-pants, and one pair of nylon socks each evening, and so to keep respectable while living in two suitcases.

A Sojourn in Canada

After arriving in New York I caught the midnight sleeper to Toronto, and woke next morning in the largest single portion of the British Empire. I was operating at the Toronto East General Hospital within a few hours of arrival. Next morning I spoke to the honorary staff and residents, a meeting of some 75 persons, with Dr. Burns Plewis, the senior surgeon, as chairman. He is also the Honorary Secretary of the Surgical Section of the combined British and Canadian Medical Associations' Meeting which is to be held in Toronto from June 20 to 24, 1955. As I have been honoured by being elected President of that Section, and Dr. Robert Janes, professor of surgery in Toronto, is one of the Vice-Presidents, I was asked to stop over for a few days so that we could talk over provisional plans for the parts of the meeting which directly concern us.

Dr. Janes was out of town at his cottage on the Lake of Bays, 150 miles north of Toronto, and there I was taken by Dr. Charles Robertson, also a surgeon at the Toronto East General Hospital, and well known in surgical and proctological circles in London. On the way north from Toronto the car ran over a dead skunk, the effluvium of which remained pungent, whether the car windows were open or closed, for 50 miles. Dr. and Mrs. Burns Plewis joined us there, and we had talks over the week-end about next year's meeting. Our Canadian colleagues are anxious that as many surgeons as possible from the old country shall attend, read papers, and take part in discussions. Subsequently I met Dr. C. W. Burns, professor of surgery of Winnipeg, another Vice-President, and he is in agreement. I hope as many of my British colleagues as possible will let either the British Vice-President, Mr. T. Holmes Sellors, or myself know as soon as possible of their intention to attend, and the subject on which they would welcome an invitation to speak, so that we may organize a really first-class programme in the two half-days that will be available for surgical subjects in a very busy week.

In Brazil

São Paulo, my next stop, is an enormous city with hundreds of huge skyscrapers, the population in a few years having increased from a few hundred thousand to nearly equal that of Rio de Janeiro. It is the second city of Brazil, the greatest industrial centre of the continent, and lies at an altitude of 3,000 feet. Near the outskirts of the city there is a very large new exposition building—in fact, a series of buildings—still partly unfinished, but the third floor—reached by an escalator and a ramp wide enough for cars—was well equipped to receive the 1,200 delegates from all countries in the world for the Sixth International Cancer Conference. One large hall accommodating 800 was fitted with hand radio-receiving sets, which allow immediate translation of speeches into four or five languages. In addition to a cinema theatre there were seven or eight other halls on the same floor, each holding about 200 persons.

Great Britain was well represented at the Conference with 29 delegates, which nearly equalled that of France, but the United States had about five times as many, and there were, of course, more from Brazil and the Argentine.

Each day of the Conference seven or eight meetings were held concurrently, and every aspect of cancer work was reviewed. Lectures and discussions took place on varied subjects, such as Cancer Prevention, Cancer Detection, Carcinogenesis, Cancer in Children, Radioactive Isotopes in Cancer Research, the Stages of Cancer, the Teaching of Cancerology, the Nomenclature of Tumours, the Diagnosis and Treatment of Leukaemias, and Nutrition in Cancer, in addition to special subjects such as the Uterine Cervix, Gastric Cancer, the Mouth, and the patient with advanced cancer.

There is no doubt that the Conference was a great success, and a great source of inspiration and education to all who attended. Those who were fortunate enough to be sent as delegates from this country are determined that the next International Conference, which is to be held in London in four years' time, shall be as good as, and, if possible, better than, the memorable meeting in São Paulo.

To reach Sydney I left São Paulo at noon, just missing a revolution, and flew to Lima, Peru. This took nine hours, and in the plane with me were Dr. and Mrs. Nelson and Dr. and Mrs. Brewster Miller. They told me of the efforts being made by the American Cancer Society in the organization of Cancer Detection Clinics. These are now being set up for people who are symptom-free to attend for a routine check-up. Not only is a bi-annual chest *x*-ray film taken, and breast self-examination taught, but a general physical examination is made, the technique of auto-vaginal smear

taught, and a twice-yearly sigmoidoscopy carried out in the over 46's. Already their work has resulted in detection of a definite proportion of cases in the earliest possible stages of the disease.

A Long Trip

We crossed first the plains of Brazil, then over more than a thousand miles of impenetrable forest where few, if any, Europeans have ever travelled, but occasionally native tracks can be seen, even from 17,000 feet, leading to watering-places. It is said that low-flying aeroplanes return with arrows stuck in their undercarriages. Then our plane crossed the Andes—mile after mile of massive snow-capped peaks among which are both extinct and active volcanoes. The staff of the Braniff air liner go to great lengths to make the trip enjoyable, not only with a descriptive booklet, but also by announcing in several languages—and all clearly understandable—each point of interest, and tilting the aeroplane so that passengers can see into the mouths of the volcanoes. The steam or vapour issuing from an active one is clearly seen, with a circle of green in the centre of the enormous barren rock.

The Nelsons and Millers left to take a few days' well-earned holiday at Lima, Peru, but I continued northwards, again in a sleeping-berth. I slept for nine hours—unaware that we had landed and taken off again at Panama, and had crossed the Equator and the Caribbean Sea—till Miami, Florida, was reached at 6.30 in the morning. There, at the sumptuous airport, I had a real American breakfast for the first time for a week. Houston, Texas, was reached at 10.30, and Dallas, Texas, at 11.50. Here an even more sumptuous restaurant provided a grand though expensive lunch. There we changed from the DC-6 to a DC-7, an even more roomy aircraft, which carried us over the vast plains of Texas, with millions of heads of cattle, and then for 200 miles along the Grand Canyon in Colorado. Gorgeous views were obtained of the multi-coloured serried rocks, the precipitous sides of which drop to the river over a mile below. Then follow hundreds of miles of barren desert and of hilly and mountainous country which forms the southern part of the Rocky Mountains; the plane then passes over Bad Water, which is the lowest point in the United States, 280 feet below sea level, and Death Valley, where the temperature reaches 132°, then Mount Whitney, the main peak of the Sierra Nevada and the highest point in the United States of America, 14,495 feet. When the hundreds of snowy peaks are left behind, the plane reaches the fertile land of California. Thus a flight of approximately 8,000 miles was accomplished in about 30 hours.

San Francisco was reached at 6 p.m. To my surprise it was bitterly cold, and, for the first and last time on the whole trip, all that week-end I wore my overcoat.

Across the Pacific

A Qantas DC-6 left San Francisco early in the afternoon of Monday, August 2, and arrived at Honolulu in six hours. We were driven a few miles to the famous Waikiki Beach. The heat was intense, and made an evening bathe by moonlight and searchlight, with many other bathers, a great pleasure. Hundreds of shops along the waterfront were open until very late, and enabled me to purchase an ultra-gaudy Honolulu beach shirt.

The plane left at midnight, and reached the coral reef of Canton Island in six and a half hours, and five and a half hours later we landed in Fiji. A stop-over of four hours enabled passengers to have a welcome shower, a meal, and a sunbath, and to take photographs of the natives.

A further five and a half hours' flight saw me in Auckland. There I was welcomed by some two dozen relations, only two of whom I had ever seen before. The oldest, my uncle aged 94, is certainly a good advertisement for going to New Zealand as a young man.

I had to give two long interviews to newspapers, and was taken all round the immediate neighbourhood of Auckland, which is surrounded by innumerable extinct volcanoes. Only two hundred miles to the south of Auckland one large volcano had just started erupting.

Mr. Douglas Robb, F.R.C.S., had kindly arranged a cocktail party, and I was honoured to meet some 50 colleagues and to give them a short talk at the Grand Hotel.

I gathered that a general practitioner in New Zealand charges a fee of half a guinea a visit or consultation, and that of this the Government reimburses 7s. 6d. The patient, provided he is able to afford it, pays the remainder direct to the doctor.

I got the impression that the general practitioners are satisfied with this arrangement, and that the reports of the rare abuse of the facilities have been grossly exaggerated in this country.

Consultants, on the other hand, are paid very poorly by the State for their hospital work. It was strongly represented to me that if the Government does not pay adequately for consultant services, there is a great danger that the present high standard of specialist treatment may not be maintained; and this would seem to be of serious portent for the future health of the nation.

At Sydney

After two very happy days in Auckland a five-hour flight took me to Sydney. This enormous city of over one million inhabitants spreads all around Port Jackson Harbour, with its imposing bridge, and is well seen from the air.

I was welcomed by Dr. Freeborn and his deputy superintendent and registrar, Dr. Douglas Tracey, and given most pleasant and comfortable quarters in the Royal North Shore Hospital. This is situated two or three miles to the north of the harbour, in the midst of a densely populated and rapidly expanding area. It covers many acres and is in process of further extensions, and will soon have about 1,000 beds. Even the older parts have been brought up to date, and I was filled with admiration for the way in which a suburban hospital of ten or fifteen years ago has become a first-class modern teaching hospital. In addition to many acres available for the completion of the building programme, there are a large playing-field, tennis courts, nurses' home, a preliminary training school, separate thoracic and orthopaedic buildings, and an impressive building housing the Unit of Clinical Investigation, under the directorship of Dr. W. Wilson Ingram.

The serious work began at 8.30 a.m. on Monday, August 9. I operated with Mr. Charles Lawes, F.R.C.S., and gave one talk later in the morning and two in the afternoon. The audiences numbered from 150 to 200, and consisted of most of the residents, many ex-students, now in all types of medical practice, and many members of the honorary medical and surgical staff. The R.M.O.s gave a large party in the evening.

Several members of the Unit of Clinical Investigation gave demonstrations of their work on the Tuesday morning. Members of the honorary staff read papers in the afternoon, and so did I, and again in the evening.

Wednesday began as Monday, with operations, followed by a morning and an afternoon talk, then a short broadcast for the Australian Broadcasting Company, and two hours spent in the evening as one of a team of a "brains trust."

Thursday morning began with a clinical conference, and several interesting cases were discussed, with papers later in the morning and in the afternoon. A pathological conference preceded a dinner given by Mr. V. M. Coppleson, F.R.C.S., at the University Club. This was followed by a lecture on "The Cancer Problem," at the main lecture hall of the city, the Stawell Hall, under the aegis of Dr. Coppleson's postgraduate committee. The hall was packed with about 400 people.

Friday morning started with a long operating session, and at lunch I met many prominent members of the University of Sydney. I spent the afternoon at the Royal Prince Alfred Hospital discussing cases and lecturing, and showing

a film to about 200 undergraduates, residents, postgraduates, and honorary staff at that famous hospital. Meantime my colleagues of the Royal North Shore Hospital had played their annual golf tournament, and I joined them for their annual dinner at the Eleanora Country Club, overlooking the magnificent views of the Pacific coastline.

Saturday morning was occupied in discussing and seeing cases at the Royal North Shore Hospital, and in the evening the honorary medical staff gave a large party at the Royal Yacht Squadron at Kirribilli, where several of us spoke.

All my talks were much enhanced by eight or nine cinematograph films, two loaned to me by Mr. Dickson Wright, two by the American Cancer Society, one each by Messrs. Ciba, Messrs. E. D. Searle, the Royal College of Surgeons, the British Medical Association, the Royal Cancer Hospital, and one of my own. I am very grateful to all who made my difficult task much easier and more appreciated.

R.A.C.S. Annual Meeting in Melbourne

We left Sydney by car, kindly loaned by Sir Norman Nock, chairman of the Royal North Shore Hospital, at 6 a.m. on Sunday, August 15, en route for Melbourne, to attend the Royal Australasian College of Surgeons' Annual Meeting. By nightfall we had passed Wagga Wagga and Albury, and reached Wangaratta. In this town of 16,000 inhabitants, which has nearly doubled in size in the last five years, Dr. Philips and his two partners have recently set up one of the most modern and well-equipped private suites of consulting and examination rooms which I have ever seen. Each doctor has two consulting-rooms, behind each of which is an examination room. Washing and lavatory accommodation faces each suite of four rooms. There are waiting-rooms, including a separate waiting-room for maternity cases, an operating theatre, and nurses' rooms. In addition to his general medical work, Dr. Philips is the local senior surgeon, and finds time to visit Melbourne 150 miles distant once every week or two, and serves as a member of the Council of the Commonwealth British Medical Association.

We left Wangaratta at 8 o'clock on the morning of Monday, August 16, and were greeted immediately on our arrival at the Windsor Hotel, Melbourne, at 11 o'clock by Mr. Charles Osborne, F.R.C.S., Mr. Julian Smith, F.R.A.C.S., and Mr. S. F. Reid, F.R.C.S.

The next morning I was honoured by being asked to give the first talk at the meeting of the Royal Australasian College of Surgeons, and to show my film. In the evening the College held a fork dinner, and the inaugural meeting was opened by General Sir Dallas Brookes, Governor of Victoria. The Presidential address was given by Professor Harold R. Dew, F.R.C.S., and the inaugural address by the Sims Travelling Professor, Sir James Learmonth.

Wednesday was occupied at the University Buildings by clinical talks by many speakers, and those of us who attended from overseas, including Professor Milnes Walker, took part in the discussions or were invited to sum up.

In the evening the annual dinner was held, at which I was honoured by being asked to respond to the toast of "The Guests." At the same time I was thus able to present to the College a book which had been entrusted to me by the President and Council of the Royal College of Surgeons of England, with their fraternal greetings.

On Thursday I was shown over the new and magnificent Royal Melbourne Hospital. Attached to this is the world-famous hospital laundry, under the control of Mr. Bernard, who showed me every facet of its fascinating machines and workings. He deals with the laundry for all the Melbourne hospitals, 70 tons a week, at a cost of 11½d. a pound, each item averaging 0.6 of a pound.

At the end of this pleasant Conference we returned to Sydney by a different route. When we reached Canberra we found the neurosurgeons and physicians, including Mr. Rex Money, F.R.C.S., holding their Annual Conference. At dinner that night in the Canberra Hotel they failed, alas, to recognize the "Nutcracker Suite" played to them by the orchestra at my request!

We drove from Canberra to Sydney across the mountains of the Great Divide, via Kangaroo Valley and Fitzroy Falls, with magnificent views of the Pacific coastline, then northwards over the Bulli Pass, along hundred of miles of mountain roads lined with gum trees by the million, reaching up to 300 ft. in height, to the famous lookout at Camberwara Mountain, which means "smoke coming out of the mountain." Thus every type of scenery had been observed in the 1,500-mile journey to and from Melbourne, but still only a small fraction of the south-east corner of this enormous commonwealth had been explored.

I had assumed that my final week in Sydney would be a rest, but this was not to be, and among much other hospitality a dinner was given in my honour at the University Club by the Council of the British Medical Association of New South Wales. We had a long talk and frank discussion about medico-political matters. Wherever I went, throughout the whole of my trip, I was impressed with the unanimous opinion that, no matter what sort of health service has been or will be introduced into any country, no nation will copy the British methods.

Back to Home

An overnight flight from Sydney took me 2,000 miles to Darwin, where we arrived just before dawn. For the fourth time in five weeks I crossed the equator, to reach Singapore early in the afternoon. Thereafter I travelled by B.O.A.C., stopping at Calcutta and Karachi. Each city has its own peculiar sights and sounds and smells, its different types of bazaar, but all were very hot and very pleasant, especially Karachi, where for many hours I was the guest of the High Commissioner for Australia and his wife, Their Excellencies Major-General and Mrs. W. G. Cawthorn. A midnight flight from Karachi took us up the Persian Gulf, across the desert, landing at and taking off from Beyrut before dawn. We travelled over Athens up the Aegean coast of Italy and above the Italian and Swiss Alps, to arrive in Zurich in time for lunch.

A final flight of two and half hours brought me to earth at London airport, feeling a nostalgia for the wide open spaces of Australia and for our colleagues throughout the Empire.

DEAF CHILDREN AND THE GENERAL PRACTITIONER

Last week we printed a short note about the unit for deaf-blind children at Condover Hall School (December 18, p. 1495). A major difficulty with these children is the early recognition that their additional handicap is deafness and not mental defect. At the Institute of Laryngology and Otology, London, on December 10 Miss EDITH WHETNALL, F.R.C.S., director of the audiology unit at the Royal National Throat, Nose, and Ear Hospital, held a clinical meeting for general practitioners at which the whole question of the recognition and management of the deaf child was discussed. Much of what Miss Whetnall said had relevance also to the special problem of the deaf-blind child.

For a proper understanding of the management of deaf children, said Miss Whetnall, it was essential to realize how the young child learnt to hear and speak and to know what constituted normal hearing. Two main processes were involved in normal hearing—acuity of hearing for sounds and the ability to discriminate between sounds. A sound might be audible without being understood, as would be appreciated by anyone who had heard a strange language, and for this reason partially deaf children often were misunderstood. The ability to recognize the meaning of sounds or of words was called auditory discrimination, and it was the most important factor in normal hearing. It depended on the presence of both a peripheral (the cochlea) and a central

mechanism (the auditory centres in the cortex). A sound was not learnt on once hearing it but only as the result of constant repetition. At 1 month of age a baby had no auditory discrimination, but thereafter slowly learnt to discriminate, and during the first year the infant came to understand some speech through continual listening. The natural sequel of this ability to discriminate was the gaining of control of the muscles of articulation, and the period from 12 to 18 months had been described as one of "readiness for speech." It should be remembered always that the listening period could not be dispensed with, for memories of sounds and associations with their meaning were acquired but slowly, and it was wrong to expect a deaf child to acquire perfect speech immediately teaching started. Auditory discrimination and speech were learnt during the first three years of life, the child's proficiency depending partly on his intelligence and partly on the opportunities for listening and imitation which the environment offered.

It was most important to diagnose congenital deafness during the first year of life—the period of "readiness to listen"—though it was still commonly not suspected until the age of 2, when the child was not talking. After three years the problem of management became progressively more difficult.

Speech Defects Due to Deafness

Miss Whetnall discussed next the problem of deafness as it affected speech and speech sounds. One had to consider separately in this regard the child born deaf and the one who had become deaf. It often happened that a child was born with enough hearing to enable him to hear vowel sounds but not to appreciate consonants. As words were understood better in context than alone and were recognized more by their consonants than by their vowels, a child with high-tone deafness would not learn spontaneously to understand speech, yet at the same time would give evidence of hearing a large number of other sounds. Some of these children did not talk at all and aphasia was diagnosed. Others were mentally retarded, and, as some form of backwardness was, after deafness, the most common cause of failure to talk properly, the early recognition of deafness was clearly important. These children might well be helped by hearing-aids, but learning to use them became increasingly difficult after early childhood.

The speaker emphasized that a very severe degree of deafness need not prevent a child from learning; only a small percentage of deaf children had no hearing at all. She showed the audiograms of two children with the same threshold of hearing but with very different perception as the result of different training. In one the deafness had been recognized early by the mother, who had always talked close to the child, who was now making progress in an ordinary school; the other had received very little training, and she attended a school for the deaf. The essence of the problem then was to detect deafness sufficiently early so that during the period of readiness for speech there could be a continual repetition of sounds within the child's range of hearing.

Deafness acquired during childhood was most commonly a complication of meningitis, and the child thus affected had perceptive deafness. Auditory training was essential, and it had to be early (whilst still in hospital) and adequate, if understanding was to be regained and certain behaviour problems avoided.

Assessing the Deaf Child

Miss Whetnall then said that it was necessary to understand that as children learnt to appreciate sound and its meaning they would react at fainter and fainter levels. If, before training, the voice could be heard at the meatus, then subsequently, after training, speech would be understood at the meatus, or at several feet with a hearing-aid, and it would be possible for the child to attend an ordinary school provided he had received the aid at an early stage. This fact must be borne in mind when testing hearing. Miss Whetnall said that the youngest child she had so far fitted with a hearing-aid was 10 months old, and it should be possible to do so at an even earlier age.

The development of the monopack type of hearing-aid had made a great difference to the treatment of the deaf child, and the whole standard of what constituted deafness was changing. The emphasis now was upon the training of residual hearing and not, as in the past, on lip-reading; in fact, it was unsuitable to encourage a child to lip read before he had been taught to listen. Deafness could and should be diagnosed by the time the child was 6 months old. An infant of that age normally responded to sound by turning his head towards it; if he did not, deafness should be suspected, and examination in a special clinic was essential. The complaint of a mother who suspected her infant to be deaf should never be dismissed lightly.

At the special clinic much patience in gaining the co-operation of the mother was needed for auditory testing and training, and a great deal of help was necessary; the later the diagnosis was made the more help would be required. There was now a small hostel in which the training of mothers and their deaf children could be established.

In conclusion, Miss Whetnall stressed the importance of the clinic seeing the children regularly and keeping in touch with their problems.

AWARD CLAIMED FOR D.D.T.

The story of the discovery of D.D.T. was told to the Royal Commission on Awards to Inventors, sitting at Somerset House, London, last week, and presided over by Lord Justice Cohen.

Mr. K. Johnstone, Q.C., with Mr. R. A. W. A. Lochner appeared for J. R. Geigy, S.A., of Basle, Switzerland, and the Geigy Company Ltd., of National Buildings, Parsonage, Manchester. They claimed an award in connexion with the discovery of D.D.T. Mr. P. S. Bevan represented the Ministry of Supply. Mr. Johnstone said that the patents were shared by the two claiming firms and no one else was interested in them.

History of the Discovery

The firm of J. R. Geigy was, said Mr. Johnstone, founded in 1778 as a firm of drysalters. Later, they became well-known as dye manufacturers. The Manchester firm was founded in 1920. "In 1932, the Geigy Company started research with the object of discovering an anti-moth specific. In the course of that research, they synthesized and tested about 6,000 compounds. They set up an institution for the providing of thousands of moths daily for the purpose of testing. You cannot set up that organization without spending or without risking a lot of money," said Mr. Johnstone.

About 1936, continued Mr. Johnstone, a Dr. Muller started research in the Geigy organization to try to find a specific against the Colorado beetle. In the course of that he synthesized and tested about 1,000 compounds. He was successful, and the successful material was D.D.T. Dr. Muller made the discovery towards the end of 1939. The name of D.D.T. was not given by the claimants but by the Ministry of Supply early in the war, and it has been known as D.D.T. ever since. Dr. Muller was awarded the Nobel Prize for his work.

"The next three years were spent in examining the effectiveness of D.D.T. against other insects and—it was some time in 1942, I think—it became clear that D.D.T. had a quite extraordinary effect against lice and mosquitoes. The first use of D.D.T. in practice was agricultural, because its first object was to deal with the Colorado beetle. We now know," said Mr. Johnstone, "that, in effect, that which was found was revolutionary. D.D.T. is very persistent and a

specific against a great number of insects. It has a persistency quite remarkable and hitherto unknown in any insecticide. One billionth of a gram on a square centimetre will kill one fly."

Wartime Use

Mr. Johnstone said that the British Forces in Northern France were provided either with impregnated shirts or with D.D.T. powder. Every man of the assault force had two such shirts, and, in all, 800,000 were issued. Reports received on infestation for the first five weeks indicated that the weekly infestation was as low as 0.6 per 100,000. The rate among German prisoners captured in 1944 was often 50%.

Mr. Johnstone said: "For every lousy British soldier there were 8,000 lousy German soldiers. Why that is, we do not know. We suspect that a German professor would not have it (D.D.T.) at any price." The manufacture of D.D.T. in Germany for all war purposes was 400 tons (406,000 kg.). For war purposes in Britain, the production was well over 7,000 tons (7,112,000 kg.).

Mr. Justice Cohen: "What about America"—"I don't know. I should imagine it was much larger."

Mr. Johnstone said that a German named Sidler wrote a report on D.D.T. in 1874 in which he discussed its melting point and insolubility in benzine. But he did not then regard it as an insecticide.

The claim before the commission was for the discovery of D.D.T. as an insecticide.

The second session opened with a film depicting research in and the use of D.D.T. principally in war conditions. This film, which ran for 25 minutes, was a War Office production.

The Government's Objections

On the third day Mr. Bevan, addressing the commission, submitted that, before the claimants had interested the Government in their product, the Government had got there "under their own steam." When the information did arrive from the claimants it only added a little more to what was already known—that it was useful for body lice and mosquitoes.

Lord Justice Cohen: "The use of D.D.T. against body lice and mosquitoes was the thing that made it of such great importance during the war."

Mr. Bevan said that the Swiss company also sent information about its product to Germany, saying "'they were neutrals and they were entitled to supply either side.' When dealing with D.D.T. one thinks of it as a means of relieving human suffering. But it is just as effective an armament in war as a bomb. To make an award in respect of an instrument of war which the inventor has disclosed to the enemy is against public policy."

Final Submission

Mr. Johnstone, making his final submission for the claimants on the last day of the hearing, said it was a case for a substantial award on the basis that a valid invention had been used by the Crown. He said that the Geigy company were genuinely anxious to help the British Government and had made several attempts to get in touch and push the matter forward. If the Swiss company had just sat back in Basle and done nothing about it, this country would not have got any benefit from their knowledge.

Referring to Mr. Bevan's argument that it would be against public policy to make an award because the company had also disclosed the information to the Germans during the war, Mr. Johnstone said: "We have a factory in Germany and were compelled to take up production. It is not a case where someone has gone hawking something to the German Government as well as to us."

The hearing concluded. The Commission's decision will be announced later.

Reports of Societies

CHILD PSYCHIATRY

The Work of a Hospital Unit

The psychiatric section of the Royal Society of Medicine met on December 14 with its president, Dr. W. MAYER-GROSS, in the chair to hear Dr. J. B. ROGERS read a paper on "A Children's Psychiatric Unit in a Mental Hospital."

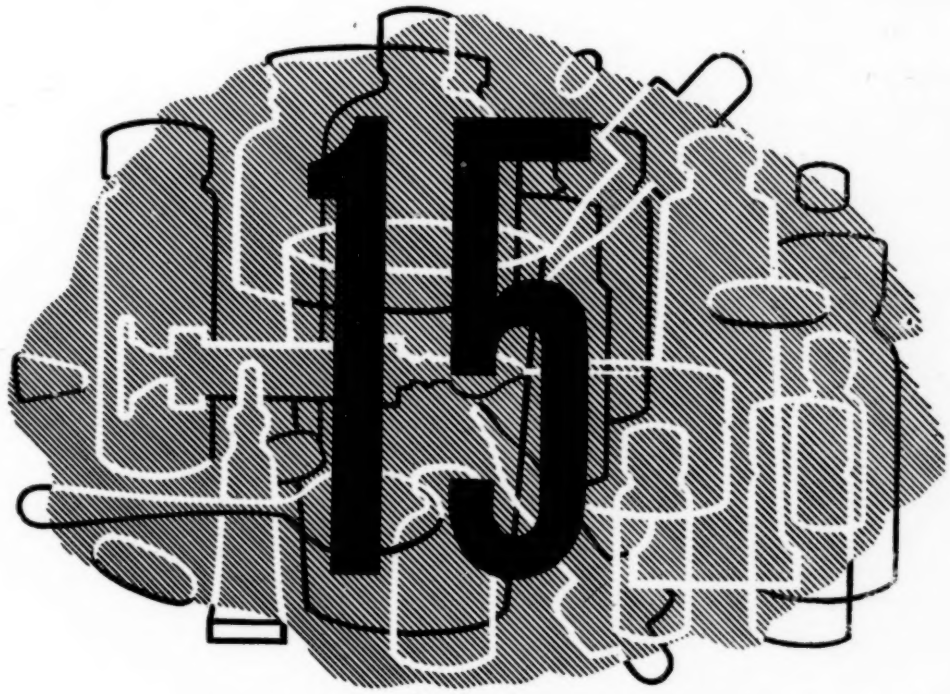
Dr. Rogers said that his unit at the Crichton Royal Hospital had been in existence only three and a half years, and was in a way an offshoot of the special unit which began in 1944 at the Mill Hill Emergency Hospital under Dr. W. H. Gillespie and became the Maudsley Hospital Children's unit under Dr. K. Cameron after the war. Also since the war units had been started at St. James's (Portsmouth), Mapperley, and Hill End. Child psychiatry was a new special subject and there was little general agreement on its field and practice. Its birth might be said to be a special unit, opened in the grounds of Professor Bleuler's mental hospital in Zurich during the first world war and later moved out of the hospital and placed largely in educational hands under a psychiatric director, and the setting up of child guidance clinics from 1918 onwards on the Continent, in the United States, and in Britain. Little was known about normal growing up, and therefore about disturbances of maturation or how to assess treatments. An in-patient unit made possible the detailed observation of children which would yield this knowledge.

The Unit

His own unit began in a moderate-sized country house called "Ladyfield," standing in its own grounds outside the hospital. There was room for 12 boys and 8 girls from 5 to 14, of all grades of intelligence above the mentally defective level, and a wide variety of cases were admissible, from those which were mainly educational problems through the wide group of those maladjusted in consequence of environmental stress to children who were problems because of brain damage. Life in the house resembled so far as possible that in an ordinary residential school. They had one full-time and one part-time teacher provided by the local education authority, and the day from 9 a.m. to 3.30 p.m. was spent in small groups at school work. The arrangements were made very flexible so that it was easy to arrange a special course, such as "domestic science," for a disturbed child who would not mix with the others and needed a nurse to itself. Even disturbed children could usually be induced to work for a while, and psychotics, for instance, would usually do two hours a day, even on admission. In addition to school, there was the usual occupational therapy, such as woodwork and sewing, and each day had its special event. On Mondays they went by bus to the seashore, on Wednesdays to town in groups to spend pocket money, on Saturday mornings to the town cinema, on Thursdays they played in a percussion band conducted by the psychologist, while on Tuesdays and Fridays they went swimming in the main hospital's bath, and this often provided an occasion for a new child to make friends. Dr. Rogers said that he believed children felt more secure when there was a routine of this kind in the week, and it gave them something to rebel against, if they felt rebellious.

Therapeutic Regime

A new child was first given full unqualified approval by the staff, and then wanted to behave well in order not to lose this approval. Settling down, in this extremely permissive and affection-giving atmosphere, took about a month. Then individual therapy began, first of all through play. Later it was possible to discuss the events of play with the child, and interpret the day-to-day happenings in its relations with others at Ladyfield. Finally, these relations were seen to resemble the relationships the child had or imagined



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with its parents, brothers, and sisters. During therapy the child's behaviour changed, and at different times it became specially attached or antagonistic to different members of the staff, or other children. It was very important at each stage that these relationships should be correctly handled, and therefore every nurse had to know the individual's family background and the particular stage of therapy reached by every child. For this reason the nursing staff had regular weekly discussions with the doctor, and the junior staff especially were encouraged to talk, since they saw most of what was going on. The occupational therapists also had weekly guidance. The heads of the nursing side, the teacher, the psychiatric social worker, and the educational psychologist met the doctors for a weekly conference on the general progress of each child. The medical staff was Dr. Rogers himself, assisted by a registrar from the hospital, who changed every three months. The nursing staff consisted of an assistant matron, a male charge nurse and a deputy charge nurse at the senior level, three fully trained psychiatric nurses (two women and one man), and five cadet nurses, girls of 15 to 17 who had just left school and would later go on to full nursing training. Student nurses were not included, because the three months which was all their training would allow was too short to be useful. There were no ward maids, because they would be outside the situation, recipients of confidences, and not under psychiatric control. All domestic work was done by the cadets and the assistant nurses. The cadets were a great success, because they were quickly responsive, and their own incomplete development sometimes made it easier for them to get on terms with the children. In the kind of "role" therapy which Ladyfield practised the assistant matron easily became a mother figure, the male charge nurse a father, while the cadets could be elder sisters.

Illustrative Cases

Dr. Rogers quoted illustrative cases. A 9-year-old boy from an affectionate home had made no progress during four years at a good school where he was happy. Psychological testing showed that though he was of good intelligence he was word-blind, and got into a panic when even simple tests were given him. Two terms of remedial teaching gave him new confidence, and he then went to a special school and would eventually go to an ordinary one. Another boy, after tuberculous meningitis treated with streptomycin, was stone deaf, subject to epileptic fits and temper tantrums, and unmanageable. He was intellectually unimpaired. His fits were controlled, and he settled down after some months. He was then transferred to a school for the deaf.

A girl, aged 8, was the middle child of three, born when her father had already been in the Army overseas for over a year, and totally rejected by the family. On admission she was doubly incontinent and refused to mix with any of the others, but remained solitary and withdrawn. Soon after admission she ceased wetting and soiling, but continued to wander about on her own, play alone, and retire to solitude to cry. She was seen daily for an hour's play with toys with the doctor, and after a time she would chatter away inconsequentially. One time she suddenly said, "Fathers never have much to do with families, do they?" Another time, in answer to a question, she said she would like to be Cinderella. After four weeks of this, she was found crying in bed by the doctor, and eventually said, "I'm never going to have a happy life. If my family don't want me, nobody will." It was then possible for her to discuss the importance of families, her own assets, and the feeling that no one, except perhaps the doctor, liked her even a little bit. At this stage the assistant matron was instructed to make a fuss of her and show plenty of affection and interest. The child soon became attached to this maternal figure, and would leave school in the middle of a lesson to visit her. The teacher permitted this, knowing the situation. The child slept in a dormitory with two younger girls and an older one. She made the older girl unhappy by inciting one of the younger ones to be unpleasant to her; again this was permitted, but another nurse was made responsible for comforting the older girl, and a third nurse had to care for the younger girl at a later stage. The affair was used by the therapist as an illustration of the child's relations with her own sisters, a point she easily appreciated. She now became more sociable, and for some time had worked well at school. Then suddenly she caused disturbances. When these were ignored she settled again and worked better than before. Later she refused to do occupational therapy, saying it was all stupid, and then this phase passed. She was testing out each situation to see if she would be rejected, and, finding she was not, settled down more securely. Her social behaviour was improving, and she no longer needed daily interviews.

This case illustrated how psychotherapy with children needed different real people to act as mother, sisters, etc., in contrast to the therapy of adults, where the psychiatrist could assume all the roles in turn himself to work through the relationships and help the patient understand them.

The same methods seemed to work with so-called psychotics. A boy, aged 7, a case of "infantile autism" (Kanner) or perhaps schizophrenia, was a very odd child who wandered alone, sometimes laughing queerly to himself and holding up two sticks as the hands of a clock. His speech was infantile (he always referred to himself in the third person), and his intelligence, which could only be judged by a few performance tests, seemed high. For the first few months he made no contact with anybody. Then he learnt the names of the nurses, and teased them by calling them the wrong names. He began interviews with a woman doctor, but would not play. He wandered round the room, repeated remarks made to him, and after ten minutes would go out to the lavatory and not come back. After some days of this, which was tolerated, he began to come back from the lavatory for a further ten minutes, and gradually as the days went by he lengthened his stays until he would stay with the doctor for three-quarters of an hour without interruption. Then he began to come closer to her, would sit on the edge of her chair, and finally on her knee. He also began to talk and showed an interest in breasts and underwear. Thus far had taken two months, when a visit from his parents was announced. He quickly became withdrawn again, so that his mother when she arrived saw no change in him, and afterwards the whole of his therapy had to be repeated from the start, though more quickly this time. His parents were advised to keep away for three months. By then he had advanced to the stage of playing with the staff if encouraged to do so, and would even sometimes play with other children. His mother, who had rejected him as a baby and felt guilty about it, had to be taught not only to love him but to tolerate his genital interests, which at first alarmed her. Since his admission, he had twice been to stay several weeks with his mother, but both times was anxious to return to Ladyfield. He now passed for normal, though he occasionally became withdrawn, or echoed remarks made to him, and for the first time he had talked of looking forward to his next stay with his mother. To get this far had needed an all-out effort by the whole staff: he could never be left alone, and he needed individual attention all the time. His ultimate prognosis was still obscure. Would he maintain his better adjustment in the unprotected environment outside the hospital?

More recently the unit had opened a second house, Ladyfield West, for a further 15 children, who were less hyperactive and destructive than the original group; and there was now a further house for 23 children from 3 to 16, and a few adults, who were suffering from mental and physical handicaps (e.g., mentally deficient spastics).

Discussion

Dr. Rogers emphasized the advantages his unit enjoyed through association with a mental hospital—not merely the full investigatory services, or stimulating contact with psychiatric colleagues, but the availability of psychiatric nurses, who were best qualified to understand and play their parts in role therapy. Teachers had a different orientation, and gave intellectual instruction rather than emotional maternal warmth.

Opening the discussion, Dr. D. E. SANDS described his unit for children from 12 to 17 at St. Ebba's Hospital, Epsom, and the common disease patterns in which anxiety led to obsessional behaviour or hysteria and then to schizophrenia, or back again, with sudden changes, which suggested that the division between neurosis and psychosis was artificial. What to do with the juvenile psychopath was a big disposal problem: they needed a special chronic hospital. Dr. K. CAMERON said children's psychiatric units had to provide a diagnostic observation service, give intensive group and individual treatment, and give long-term care to chronics. He echoed the need for some solution to the problem of the disposal of the chronic case.

Further discussion took up aspects of Dr. Roger's work, and debated the possibility that paediatric nurses and paediatric hospitals might help with further psychiatric units.

THE VOLTA RIVER PROJECT

At the meeting of the Royal Society of Tropical Medicine and Hygiene at Manson House, London, on December 9, Professor G. MACDONALD, of the London School of Hygiene and Tropical Medicine, discussed the medical implications of the Volta River project. The Volta flows into the Gulf of Guinea after traversing the Gold Coast and picking up tributaries which together form an extensive system. The project, said Professor Macdonald, was to erect a dam in the main river a short distance from the coast, which would create a lake 200 ft. (60 m.) above the present level of the river, extending for some 200 miles (320 km.) along the course of the river and its tributaries. This was proposed as a source of hydro-electric power which would be used principally for the smelting of bauxite, of which large deposits exist near by, providing aluminium as a valuable export. The creation of such a dam would affect the relatively sparse populations inhabiting the river system, and would create new medical problems. It would be the largest scheme of its kind in the world, and its medical implications would therefore be of the utmost importance.

Surveys have been made in great detail. The most important problem was thought to be onchocerciasis, which was already prevalent in the Gold Coast, leading to a heavy incidence of blindness. On the whole, however, Professor Macdonald thought that the creation of this vast lake could be accomplished without increasing the breeding-places of the blackfly *Simulium damnosum*, which carries this disease and which typically breeds in rocky streams; it might even be possible by eliminating rapids and by careful control of water flow to reduce its breeding.

Water on this scale also meant the probability of increased breeding of *Anopheles gambiae* and *A. funestus*, the dangerous carriers of malaria in those parts, went on Professor Macdonald, but malaria could probably be controlled. Sleeping sickness carried by tsetse flies which haunt waterside country was another obvious danger, and so was schistosomiasis, and the latter might prove difficult to deal with.

Dangers of Urbanization

Apart from these parasitic diseases, there were the problems inherent in the creation of a large factory, and the accompanying growth of a town which might rise to 100,000 inhabitants, in a country where industrial development was still in its earliest stages. Another aspect of this problem was the anticipated large-scale migration of labour from the Northern Territories: it would probably be a mistake to draw labour from the peoples of the south, if in so doing the agriculture of the area would be seriously disturbed. Professor Macdonald concluded his address by giving an estimate of the medical and health services necessary for the whole project.

Dr. CHARLES WILCOCKS drew attention to the risk of the crowd diseases inherent in the creation of an industrial city—tuberculosis, venereal diseases, intestinal infections, malnutrition. He thought that these, rather than the parasitic diseases, would provide the most intractable problems, as they had in other African cities.

Mr. T. M. K. MERCER, Gold Coast Commissioner, made the point that the Volta scheme was still a project which required much research before it could be implemented. He spoke of it as an important exercise in international relations, and alluded to the interdependence between the people of the Gold Coast and the British, Canadian, and other experts who had investigated the problem in all its aspects. This idea of co-operation between the Gold Coast government and British institutions was also stressed by Sir GEORGE MACROBERT, who emphasized the part that the Society could play in advising on the health problems which the project might entail.

Nova et Vetera

SKLIFASSOVSKY INSTITUTE FOR TRAUMATIC DISEASES

Nicholas Vassilievitch Sklifassovsky died 50 years ago, on November 30 (old style), 1904, near Poltava in his native Ukraine. Though his name is perpetuated in the famous Sklifassovsky Institute for Traumatic Diseases in Moscow, it does not appear in such histories of medicine as Garrison's and Castiglioni's. Yet he would seem to have earned his niche in medical history, and Professor Sergei Sergevitch Yudin, as director of the Sklifassovsky Institute, published in 1942 an interesting memoir on its founder.[1]

Sklifassovsky was born on March 25 (old style), 1836, both his parents being Ukrainians. He received his schooling in the second gymnasium of Odessa and then studied medicine in Moscow, qualifying in 1859. Later he worked as a surgeon in the town hospital of Odessa, gaining some reputation for his gynaecological operations. Sklifassovsky studied foreign medical literature with assiduity, and in 1866 spent some time in Germany studying pathological anatomy with the great Virchow and surgery in Langenbeck's clinic. Subsequently he worked in Nélaton's clinic in France, and thence came to England and Scotland, where he became on friendly terms with J. Y. Simpson. On his return to Russia Sklifassovsky held posts in Kiev University and in the medico-surgical academy of St. Petersburg. In 1880 he was made professor of surgery in Moscow University, and there tried in the face of much opposition to introduce Lister's antiseptic methods. From Professor Yudin's account Sklifassovsky was evidently a bold and resourceful surgeon, and became especially known for his work in plastic surgery—his headway in this was all the more remarkable, Yudin points out, because he had only just begun to apply antiseptic methods. But his name is likely to be known because of the institute which resulted from his efforts to build towards the end of the nineteenth century what he called his "little clinical town."

Sklifassovsky Institute for Traumatic Diseases

[1] *Nicholas Vassilievitch Sklifassovsky.* By S. S. Yudin, edited by Dr. B. V. Nephontov. Moscow, 1942.

WILLIAM AUSTIN

1754–1793

William Austin, had he lived longer, might well have become as familiar a name as Percivall Pott, whom he attended, with Heberden and Milman, soon after his appointment as the first lecturer on chemistry at St. Bartholomew's Hospital. Pott thought highly of him and told Sir James Earle, "You will see Austin at the head of his profession." Sir James Earle, who was Pott's son-in-law, wrote biographies of both of them. Yet, though Austin died at the early age of 39 (Pott died at 77 and Earle at 62) and did not live to fulfil Pott's prognosis, he is not quite forgotten. Cowper has immortalized him in a sonnet:

> Austen! accept a grateful verse from me,
> The poets' treasure, no inglorious fee.
> Loved by the Muses, thy ingenious mind
> Pleasing requital in my verse may find;
> Verse oft has dashed the scythe of Time aside,
> Immortalizing names which else had died:
> And oh! could I command the glittering wealth
> With which sick kings are glad to purchase health;
> Yet if extensive fame, and sure to live,
> Were in the power of verse like mine to give,
> I would not recompense his art with less,
> Who, giving Mary health, heals my distress.
> Friend of my friend! I love thee, though unknown,
> And boldly call thee, being his, my own.

Dated April 16, 1792, this sonnet to "Dr. Austen, of Cecil Street, London," was the only payment poor William Cowper could make. Mary Unwin, his main bolster, had had a stroke, he was short of money, and it was only owing to William Hayley that the services of Dr. Austin were secured. Hence the phrase "friend of my friend."

Austin's friendship with Hayley was a close one. Hayley engaged his only son to be articled to him, and would defer to Austin's consideration the illnesses of his friends, for Hayley himself had once contemplated medicine as a career, before the muses caught him. Almost one of Austin's last acts was to give Hayley, in the Christmas of 1792, a shower-bath, which Hayley erected in his Eartham home. He has described it for us:

> A little wooden tower, stationed in the hall, which had a very large circular tin vessel on the top of it, which, on pulling a string, revolves, and throws a deluge of water on the head and limbs of the prisoner in the said tower, which admits only a single person. I had no conception of the force and effect of this mode of bathing . . . but I now prefer it to every other kind.

Every day Hayley summoned up his resolution to take his cold bath, and confessed he was "almost stunned by the force of the water" upon his head. Austin's own love of physical well-being led him often to walk from Oxford to London in a day.

Perhaps one reason why Hayley and Austin were such friends was that Austin (nine years the younger) had been a man of letters before he was a doctor. Indeed, his virtuosity was in the best eighteenth-century tradition. Born at Wotton-under-Edge on December 28, 1754, the son of a clothier, he was educated at the local grammar school before entering Wadham College, Oxford, at the age of 19. He soon obtained an exhibition in Hebrew, another in botany, became a scholar of the college, and after taking his B.A. in 1776 was appointed assistant tutor to the Laudian Professor of Arabic, lecturing on the language. Three years later, when he was 25, he began his medical studies at St. Bartholomew's Hospital and took his M.B. in 1782 and his M.D. in 1783.

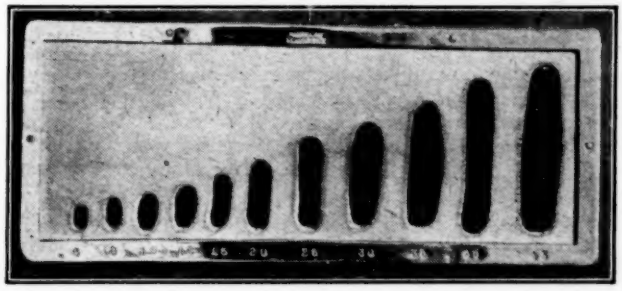
Into the ten years of life he was granted after his professional qualification he packed a great deal. He not only practised at Oxford, but also lectured there on mathematics. He was elected professor of chemistry in 1785 and became physician to the Radcliffe Infirmary. In 1786 he removed to London, and in the following year was elected a Fellow of the College of Physicians, giving the Goulstonian Lectures in 1790 on "The Origin and Component Parts of the Stone in the Urinary Bladder," which, if it reads oddly now, nevertheless did differentiate arterial deposits from the white material found in gouty joints. His two papers in the *Philosophical Transactions* on "Heavy Inflammable Air" show that his mind was ranging wide. Munk says that he was earning over £4,000 a year in his London practice. Had he been granted the psalmist's allotted span he might have received more adequate treatment at the hands of historians of medicine. He died "of a fever" on January 21, 1793, leaving six children, four by his second wife.

W. H. G. ARMYTAGE.

Preparations and Appliances

DEVICE FOR MEASURING MITRAL VALVES

Dr. GUNNAR NESE, of Oslo, Norway, at present surgical registrar, Shotley Bridge Hospital, Shotley Bridge, Co. Durham, writes: It is of some interest to know the size of the mitral valve before and after a valvotomy. For this purpose I have constructed the "valvometer" illustrated. It consists of a sheet of rubber of specified thickness and elasticity, kept taut by a metallic frame, in which



a series of holes of different lengths have been made; they are marked in millimetres. These holes are made so that their shape, and the resistance when a finger is pushed against or into them, resemble as much as possible those of the majority of valves encountered at operation. By pushing the finger against or through the different holes in the "valvometer" immediately after having felt the valve it is surprisingly easy to pick out the one nearest in size. Sterilization is carried out by dry heat. This device is made by Robert Whitelaw Ltd., Newcastle-upon-Tyne.

Speaking at the opening of a home for old people at Kidderminster recently, Miss PAT HORNSBY-SMITH, Parliamentary Secretary to the Ministry of Health, referred to the conspicuous progress made by local health authorities in England and Wales during the past six years in providing small homes for the aged in need of care and attention. When the National Assistance Act came into force in 1948 there were about 60 small homes in the ownership of local authorities, she said. Now 749 were open, with accommodation for 21,100. Of these 35 were buildings of new construction specially built for the purpose, the remainder converted properties. Among schemes in the course of completion were 53 new buildings. Nor could the voluntary organizations, mostly housing associations, be left out of the reckoning in the magnificent work done in opening up residential accommodation for the aged. But the steady expansion of the programme of old peoples' homes was only part of the story in the care of the aged. About 95% of old people of pensionable age lived in their own homes. Where district councils under their housing power erected bungalows or grouped dwellings for the elderly the county council might make a payment towards the cost under Section 126 of the Local Government Act, 1948. The consent of the Minister of Housing and Local Government was required, but he had given an assurance that, subject to reasonable financial arrangements, this would be granted readily.

Correspondence

Because of the present high cost of producing the Journal, and the great pressure on our space, correspondents are asked to keep their letters short.

Leukaemia and Pregnancy

SIR,—Dr. James Allan (*Journal*, November 6, p. 1080) has presented a most interesting summary of the literature on leukaemia and pregnancy, and I hope he will not take amiss these few observations. First, he quotes a foetal mortality rate in chronic leukaemia of 37.5% and states that 50% of this mortality is due to stillbirth and prematurity, but he does not discuss the contribution of anti-leukaemic measures to this high foetal mortality. Irradiation of the spleen in chronic myeloid leukaemia may contribute sufficient dosage to the ovaries to give rise to abnormal genetic combinations in future pregnancies, as in the case reported by Edwards and Freeth.[1] This patient was treated with urethane in June, 1947, and by a dose of 900 r with *x* rays to the spleen in November, 1948, and gave birth in September, 1949, to an infant with spina bifida and myelocoele who died one week later. Furthermore, even irradiation of the chest and long bones during pregnancy may, as stated by Erf[2] in a follow-up report on a case of Angelucci,[3] damage the developing foetus. In Dr. Allan's conclusion that "treatment of anaemia and antileukaemic measures will enhance the chance of foetal survival" we should therefore add that these measures should be chosen with care. It may also be thought that a past history of radiation to the spleen should be considered sufficient justification for termination in the early stages of the pregnancy.

Secondly, the case quoted by Cameron[4] did in fact survive three pregnancies after leukaemia was diagnosed, and three of her children, besides several other members of the family, are said to have suffered from this disease, but documentation is quite inadequate and it seems most probable that the condition was in fact one of familial jaundice. Multiparity in the course of leukaemia has, however, been established, amongst others, by the case reported by Angelucci.[3]—I am, etc.,

Baltimore, Maryland, U.S.A. ROBERT J. DICKSON.

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[2] *Amer. J. clin. Path.*, 1947, **17**, 268.
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Cracks in Ampoules

SIR,—In view of the importance of "invisible cracks" in drug ampoules leading to contamination of their contents, I think that the following incident should be reported.

On taking a "tubarine" ampoule out of its box for immediate use, I noticed that it was almost empty, containing only a very small quantity of yellow oily solution. There was no obvious crack in the ampoule, but on examination with a lens in a good light a minute flaw in the base was visible. The ampoule was sent to Professor Buttle, of the School of Pharmacology, University of London, and he very kindly made a biological assay on the remaining fluid (about 0.2 ml.). This was found to be of about eight times the strength of the original solution (10 mg. per ml.), so that nearly all the water had escaped and none of the alkaloid.

This would seem to show quite clearly that fluid can escape through a crack so small as to be unnoticeable and that the remainder of the contents may be of much higher concentration than the original solution. It would also seem to be a fair deduction that, if such an ampoule was kept in an antiseptic solution or vapour, the contained fluid could be contaminated and might give rise to severe toxic effects if injected.—I am, etc.,

London, E.C.1. C. LANGTON HEWER.

Control of Hypertension by Hexamethonium

SIR,—We appreciate the fair comments on our paper (*Journal*, November 27, p. 1243) made by Dr. E. A. Harris (*Journal*, December 11, p. 1417) and the close scrutiny which he has given to our rather exacting tables. Most authors on the treatment of hypertension with hexamethonium have come down heavily for or against it. We feel that there is no simple answer as yet regarding the efficacy of this form of treatment. What has most impressed us is the wide range of response to hexamethonium, a variation which cannot be closely correlated with the initial sensitivity tests. It is for this reason that we have given details of all our treated cases rather than illustrative examples, for these can be found to support any shade of opinion on the controversial subject of blood pressure control with ganglion blocking agents.

We do not state what we regard as "adequate" blood pressure control because, as Dr. Harris rightly indicates, this is not yet known. Blood pressure control is good when readings are near normal for the whole 24 hours. In some patients treatment eventually had no effect on the blood pressure at all, and assessment of control was therefore "nil." Control was regarded as poor when there was only a slight reduction of blood pressure for a few hours, and was considered to be fair if readings approached normal during some period of the 24 hours, even if before an injection the pressure had returned to a high level. We did not make it clear in our paper that the blood pressure recordings and the time they were taken (Table IV) were not the only figures which we used for assessment. They were the last readings taken during out-patient attendance at hospital or during the last 24-hour admission for "round the clock recordings."

We agree with Dr. Harris's comment that hexamethonium is a bad placebo and there are many substances with no side-effects which could be used. However, patients attending a clinic for hypertension are greatly encouraged by a treatment aimed at lowering the blood pressure. If the drug is discontinued, the patient may rightly feel that the treatment has failed. When three tablets or so of hexamethonium a day are given they do not suffer this feeling of failure, and such a dose is devoid of side-effects. Although we believe that "renal failure with a rising blood urea is an absolute contraindication to hypotensive therapy," the patient of Dr. Harris with an initial blood urea of 31 mg. per 100 ml. and a urea clearance of 30% would certainly be treated by us with hexamethonium. Perhaps we should have stated ". . . a *rapidly* rising blood urea." In these patients the rise in the blood urea needs to be halted if possible before lowering of blood pressure is attempted.—We are, etc.,

K. SHIRLEY SMITH.
P. B. S. FOWLER.
V. EDMUNDS.

London, W.C.2.

Prevention of Colds

SIR,—In their letter (*Journal*, December 4, p. 1354) Drs. O. M. Lidwell and R. E. O. Williams state that the "aerovap" vaporizers with thermostats set at 126° C. held the liquid hexylresorcinol at 116° C., and that the output was at the recommended rate, quoted in their original paper at 125 mg./room/hr. The theoretical output of four units set at 125° C. is 120 mg./hr., the liquid temperature at that setting averaging 120° C. Numerous attempts have been made to estimate the aerosol concentration of treated air, but so far no reliable technique has been evolved. Foreign substances, such as tobacco smoke, traces of hypochlorous acid, etc., badly interfere with the colour reactions. However, in past practice an actual output of 5 to 10 μg./cubic ft./hr. (176 to 353 μg./cubic m./hr.) has always proved effective whatever absorption losses, if any, may have been.

It is difficult to appreciate what significance Drs. Lidwell and Williams would have one attach to their statement that three earlier investigators failed to report the effect of hexyl-

resorcinol on the normal flora of the air. A definition of "the normal flora of the air" would be most useful. How your two correspondents can possibly say that "there is no discrepancy between our results and Dr. MacKay's experiments with sprayed cultures" is past understanding, unless, of course, they mean "with sprayed cultures our results (1948) were substantially similar to those of MacKay (1952)." Those results were, incidentally, confirmation of those published by my colleagues and myself from 1940 and onwards.

The Newcastle results are so clearly inconsistent with previous ones that I should like briefly to review the history of this subject. The main points are these: (*a*) Two independent teams (Twort *et al.*[1-4] and M.R.C.[5]) concluded that hexylresorcinol is the best or at least amongst the best chemical agents for the purpose. (*b*) A third independent worker (MacKay)[6] reported very successful results on large-scale tests with thermally generated aerosols of hexylresorcinol. (*c*) Two further investigators (Dickson[7] and McGrath[8]) reported successful practical trials using hexylresorcinol aerosols thermally generated. (*d*) Lidwell and Williams,[9] using the same technique, reported failure. (*e*) There are thus five favourable reports to one unfavourable, and inquiry into the amount of work represented by each reveals the fact that the failure covered six months' trials, whereas the records of Dickson and McGrath alone covered nearly five years each. (*f*) In spite of these facts, Drs. Lidwell and Williams make not the slightest attempt to account for their discrepant results or even to suggest that explanations are called for. In fact, Sir, readers of their paper are left with the impression that theirs is the last word on the subject and their conclusions irrefutable.—I am, etc.,

Avebury Research Laboratories, Goring-on-Thames. A. HOWARD BAKER.

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6 *J. Hyg. Camb.*, 1952, **50**, 82.
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8 Ibid., 1953, **6s**, 343.
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Q Fever in Britain

SIR,—In your annotation on aureomycin and terramycin (*Journal*, November 20, p. 1216) you state: "The absolute indications for aureomycin and terramycin—undulant fever, psittacosis, and Q fever—are rare diseases."

M. G. P. Stoker in "Q Fever in Britain"[1] states that from the presence of Q-fever antibody in the sera of blood donors it is estimated that over 2% of the population have been infected by the rickettsia of Q fever, half a dozen in every small village. In the south-east of England it is commoner, 2.96%, and "it is calculated that this represents some 30,000 infections in Kent alone." Admitting that most cases are asymptomatic, or at any rate their symptoms do not drive them doctorwards, it can hardly be called a "rare" disease. Surely "unrecognized" is the right word, and practitioners especially in the south-east would do well to bear it in mind in dealing with strange infections of the bronchial tree, rigors without reason, and multiform malaises.—I am, etc.,

Rye, Sussex. C. G. LEAROYD.

REFERENCE

1 *Brit. med. Bull.*, 1953, **9**, 231.

The Changing Aetiology of Heart Disease

SIR,—I have read with great interest and admiration Professor W. M. Arnott's stimulating article on "The Changing Aetiology of Heart Disease" (*Journal*, October 16, p. 887). While discussing the aetiology of ischaemic heart disease and the problem of atherosclerosis, Professor Arnott has put forth a plea that in Africa, India, and the Orient these diseases are uncommon, due to lack of what he calls a "better" diet in these countries. He says: "Nevertheless, while the evidence is not of the same quality as in the materially more favoured countries, it is uniformly consistent with the conclusion that the diseases are comparatively very uncommon." It is very difficult to accept the above statement without comments. I would draw Professor Arnott's kind attention to some of the recent publications from this country.[1 2 3] The coronary-hypertension group form 48.8% of my cases, when private as well as hospital patients are considered together, in the total number suffering from organic heart disease seen in the Punjab. Vakil from Bombay quotes a figure of 33.2% in the same group from hospital class of patients where the upper classes can be excluded, otherwise his figures would be still higher. It is impossible to give a convincing statistical proof that hypertension and coronary diseases are not uncommon in India. It is, however, not wrong to submit that the view that coronary disease is less common in this country when compared to some of the "materially" more favoured countries at best can only be a big guess. In the younger age groups also the disease is not rare in this country. In a five-year study of 276 cases of coronary disease published by Wig and myself[4] 7% belonged to the age groups below 40 years.

There are two important factors in the aetiology of coronary disease on which there is a common agreement. One of them is that the female sex enjoys comparatively a great immunity to ischaemic heart disease. This is true both of East and West. Our own figures are seven males to one female. The other is the factor of heredity and family history. If we search in the direction of these two factors we may find some answer to this ever-increasing disease which is taking a considerable toll of life from our own profession in all the countries.—I am, etc.,

Amritsar, India. R. P. MALHOTRA.

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2 Vakil, R. J. (1949). *Indian Heart J.*, **1**, 15.
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Staphylococcal Infections in General Practice

SIR,—Dr. L. Roodyn's article on staphylococcal infections (*Journal*, December 4, p. 1322) contains much valuable information. There are, however, two points which call for discussion: (*a*) 500,000 units of penicillin (crystalline) would only maintain a sufficient blood level for a period of four hours, and single daily dosage could not be expected to result in the elimination of staphylococci. (*b*) The role of symptomless nasal carriers is hardly given sufficient weight. In our experience of similar cases, staphylococci of the same type as that in the patient's lesion have very often been found in the nares of one or more symptomless members of the household.

Simultaneous treatment of infected members of a household with penicillin (provided they are fully sensitive) has seldom been followed by relapse. Clothes and premises should of course be spring-cleaned at the same time.—We are, etc.,

M. E. M. THOMAS.
J. H. COWLARD.
London, N.9.

Haemoglobin Production in Grossly Undernourished African Bantu

SIR,—From a comprehensive review of haemopoiesis in gross undernutrition, Keys and co-workers[1] concluded: "The evidence is overwhelming that anaemia develops during prolonged periods of caloric restriction, and the degree of anaemia appears to be related to the extent of the starvation. The anaemia . . . is not of the iron deficiency type." In the M.R.C. publication on *Studies of Undernutrition, Wuppertal, 1946–9*, Sherlock and Walshe[2] noted diminished

blood volumes and low concentrations of haemoglobin, with deposition of iron in certain organs. They stated: "Since the haemoglobin in the blood stream is below normal levels, it is uncertain why the stored iron is not used for the manufacture of new haemoglobin. It has been suggested that the intake of dietary protein may be too low to allow the production of sufficient globin, but there is no concrete proof of this."

In the adult South African Bantu the iron picture is characterized by extremely high iron intakes (as much as 200 mg. per day), by elevated values for serum iron and total iron binding capacity, and by excessive deposition of the element in the viscera and other tissues, such deposition being present in about half of the urban adults examined at necropsy.[3] An interesting question thus arises regarding the haemoglobin levels of Bantu adults when grossly malnourished or undernourished. Do the high iron reserves act as a "brake" on the depression of values to be expected from severe deprivation of calories and other nutrients? Or, since the anaemia of undernutrition is not believed to be of the iron deficiency type, do low haemoglobin levels occur despite iron "overload"? To throw light on this issue, records were examined of 35 men and 21 women, these subjects being among the most severely undernourished and malnourished patients (25–50% under-weight) seen at Baragwanath Non-European Hospital (1,350 beds) during the last three-year period. Among these patients "pure" undernutrition was rare; three quarters were suffering from pellagra. Mean haemoglobin values, standard deviations, and ranges, after correction for the altitude of Johannesburg (5,700 ft.—1,740 m.), for the 35 men were 12.1 ± 1.2, range 7.0–15.2 g.%; 37% of the patients had values of 14.0 g.% or more; for the 21 women, 12.1 ± 0.8, range 6.0–15.2 g.%; 48% of the patients had values of 12.0 g.% or more. Mean values are certainly higher than would be expected from the patients' clinical state. Thus, under the special dietary conditions which cause iron reserves to be unduly high, severe dietary privation need not lead to unduly low haemoglobin levels. In more than a third of the patients haemoglobin values lay within normal limits; hence one of two alternatives would appear to be valid. Either the present importance attached to haemopoietic factors other than iron is exaggerated, or the amounts of the other factors required are smaller than is usually believed, because they must have been contained in sufficient amounts in the Bantu patients' meagre diet, which had been consumed in most cases for several months previously. Details of this and related studies will be published elsewhere.—I am, etc.,

Johannesburg. A. R. P. WALKER.

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World Population

SIR,—Dr. W. R. E. Harrison's views (*Journal*, December 4, p. 1353) are certainly very different to mine. His ideas might possibly apply if a materialistic philosophy is adopted, and I would agree with his letter in parts, for "what we need and have not got is wisdom to use the pack of power which science has all of a sudden dumped on our hands" is only too true. First of all, let me be quite clear that by "love" I mean Christian love—friendship, fellowship, the love of man for man. "Surely 'love' can only make the problem worse," when applied to over-population. is almost equivalent to a policy of let them starve, and surely it is not necessary to take this inhuman attitude even in a materialistic state. The population of the world was fairly well stabilized until comparatively recently, and it may be that when a generally higher standard of living is reached, and a higher standard of fellowship is attained, the population of the world may stabilize itself again. There are so many factors to be taken into account that it is impossible to prophesy, and my plea in my previous letter (*Journal*, November 6, p. 1104) was for a more optimistic outlook.

Industrialization requires careful control, otherwise it does spoil the beauties of the land, but over-population may be only a temporary evil. In any case man is mainly responsible for both these problems, and it is up to man to avoid spoiling natural beauty when it becomes necessary to industrialize an over-populated area. It is even more important that moral development is encouraged along with this industrialization, and this is where Christ's gospel of love—i.e., to love God and to love your fellow men—will help to solve the problem and not make it worse. Dr. Harrison asks me to turn to the opening words of the Bible where it is written that God made the heavens and earth and "saw that it was good." May I remind him that, in chapter three of Genesis, man ate of the tree of knowledge of good and evil and this act made the world bad. Allegorical, maybe, but true nevertheless.

I am convinced that the acceptance of his advice that the emphasis should be on things would be the very way to precipitate that cataclysmic crash mentioned in his letter. The solution to over-population offered by Dr. Harrison is called super-human, and that is very true. In other words it is quite impossible for man to go back in a physical sense, so as to provide a way of life at least as good as the primeval laws of nature, but he could go back in the spiritual sense, and here lies the answer to the problem. As Clifford Bax wrote, "Turn back, O Man, forswear thy foolish ways."—I am, etc.,

Norwich. G. K. MCKEE.

A.C.T.H. and Cortisone in Skin Disorders

SIR,—I was interested to read the excellent report of the Medical Research Council on the treatment of skin disorders with A.C.T.H. and cortisone (*Journal*, December 4, p. 1307). There seems, however, to have been one omission under the heading of "Complications of Hormone Therapy." A by no means uncommon complication is a widespread furunculosis, which is a very troublesome condition to the patient, and may cause interruption in treatment. The lesions are typical painful boils, and could not be covered by the term "folliculitis" mentioned in the report. There may, of course, have been no cases of true boil formation in the series described, but as an adequate number of cases of exfoliative dermatitis and eczema were investigated this rather surprises me, as my cases of furunculosis have occurred mainly in these groups.—I am, etc.,

Bradford. ALLAN BIGHAM.

Cancer of the Uterine Cervix

SIR,—I read with interest your leading article, "Cancer of the Uterine Cervix" (*Journal*, December 11, 1954, p. 1404), and would like to make the following suggestions. Could an inquiry be made in future into the method of contraception, if any, practised, first, between patients with cancer of the cervix and their spouses, and, secondly, between control pairs? If smegma was a causative factor, as suggested by you, a significant difference in the methods of contraception might be seen, with the cancer patients having a greater incidence of coitus interruptus than the controls. In the control pairs a greater use of condoms may be found, the condoms protecting the cervix from smegma. An inquiry into the causes of death of Roman Catholics and Protestants might show a greater incidence of carcinoma of the cervix in Roman Catholics due to a lesser use of contraceptives. Similarly might deaths due to cancer of the cervix show a greater proportion of Roman Catholics than their numbers in the general population would lead one to expect.—I am, etc.,

London, W.C.1. E. H. L. HARRIES.

Registration of Cancer Cases

Sir,—I read with interest Mr. W. D. Parks's letter (*Journal*, December 11, p. 1418). I have never heard any suggestion that cancer should be made a "notifiable" disease, but it seems there would be certain advantages if such a measure were introduced. It would have the effect of making cancer statistics more complete, as it should take in the few cases which never reach hospital and of which nothing is known officially until after their death. It would render possible investigation of cancer cases from a public health angle—that is, the patients' general background, habits, and conditions of employment could be recorded, thus providing a pool of information which could be made available to the cancer researcher.

The recent work on cancer of the lung and its relation to smoking provides an instance where reference to a register, compiled by the local authority, such as I suggest, would surely have been of assistance to the investigator. If one considers the parallel of tuberculosis, its notification and the consequent investigation of the background of cases have undoubtedly added to our knowledge of this disease to a much greater extent than the original reason for its having been made notifiable.—I am, etc.,

Tiverton. GEORGE NICHOLSON.

Paranormal Healing

SIR,—Dr. Louis Rose is to be warmly congratulated on his article on paranormal forms of healing (*Journal*, December 4, p. 1329). Only a few decades ago such an article would have made many of our profession mock, and your predecessors, Sir, refuse it. Dr. Rose has begun to clear a blind spot in the retina of our profession. I do not think, however, that he is clear in his own mind about miracles. The definition of the word is "an event outside the known course of nature." It was a miracle to doctors before Jenner's day that man should be able to protect himself against smallpox. Until oculists demonstrated that sight could be restored to the blind by dislocating an opaque lens, such a sudden restoration of sight was a miracle. Who knows but that Our Lord restored sight to the blind by such a method? Again, when I was a student we were taught that when a man's heart stopped beating he was dead, and since then many patients have been raised again from the dead by surgeons and anaesthetists. What was a miracle once has become a commonplace now. Indeed, a wealthy man can no doubt ensure himself eternal life by arranging with his doctor to have an artificial heart and an artificial kidney at hand before he "dies," if an artificial liver can be arranged for him. And we shall never be able to decide clearly, in most cases of "miracles" by healers, who or what did the healing. After all, when a resident nurse and a doctor treat successfully a man with pneumonia, who has healed him, the nurse or the doctor? To ask the question is to make oneself ridiculous.

All healing comes from God. I challenge any botanist to show us what evolutionary purpose is fulfilled by the presence of drugs in plants. God put them there for us. If the reply is made that the poisons in the plants prevent them from being eaten by animals, I would answer that you can feed a rabbit enough belladonna to poison the man to whom you give the rabbit for a meal, but not to poison the rabbit. All healing, like all health and all life, comes from God, who works in many various and amazingly different ways, but He never breaks His own laws, and in the end we shall find the "explanation" of every miracle. But I have put the word "explanation" in inverted commas, because we are only a little nearer explaining mysteries than we ever were. We can but describe, in ever more detail, how life works, but we cannot even explain yet why, when a man cuts his skin, the cells multiply till the wound is just made good, and then they cease to multiply.

I suggest that we try to forget the word miracle, and go on with the study of life, some as pathologists, some as G.P.s, some as priests, some as healers. Fundamentally we are all doing the same work. But by all means let the doctors investigate the healers, and, if the latter can increase the number of "spontaneous" cures of cancer, here is good hunting to them.—I am, etc.,

Colchester. M. E. LAMPARD.

Poliomyelitis Quarantine

SIR,—Following a severe outbreak of poliomyelitis in 1953 the Taunton Borough decided in 1954 to implement some of the findings of the W.H.O. Expert Committee on Poliomyelitis, November, 1953. It was decided that, for the first two or three cases of poliomyelitis occurring in a private house in the town, a resolute attempt should be made to enforce a "house and garden" quarantine on all domiciliary contacts for a period of three weeks, the council undertaking to pay "lost" wages wherever necessary. The details of this experiment, which in the event proved to be extremely limited, may nevertheless be of interest. The precise procedure to be followed and provision for various eventualities was worked out minutely in the early summer. Only one case occurred, along with two "false alarms."

The patient was a young woman of 19 living in a council house with her father, an old-age pensioner, her brother, a railway employee, her sister, a clothing employee, and the sister's child aged 5. The sister's brother was in the Navy and her husband lived away. On the removal of the case the circumstances and the rationale were explained to the household, and they all readily agreed to abide by the proposed restrictions. Briefly, these were as follows: No person or article was to be allowed out of the house and garden, other than empty milk bottles which had stood for 24 hours in a dustbin containing "chloros" supplied by the council. The local isolation hospital agreed to admit any cases of sickness other than minor. The county medical officer kindly sanctioned the seconding of one of the local health visitors for special duties. This health visitor collected three sets of wages, an old-age pension, a separation allowance, two National Health Insurance allowances, and a National Assistance grant, and the authorities concerned were all extremely co-operative, relaxing their rigid rules. Over the garden gate nurse took all shopping orders and arranged for the necessary deliveries. She also wrote several letters, some of which were warning people not to visit. All the above arrangements worked extremely smoothly, nurse's only worry being the balancing of her accounts. After the first week it was agreed that she be allowed to carry out certain duties elsewhere.

The employer of the sister readily agreed to pay her wages in full, less the National Health Insurance allowance to which she was entitled on a certificate of the medical officer of health. British Railways were willing to pay the brother provided the council themselves had no such powers. As, however, such powers were available under a private Act, the expense fell upon the council. Only the basic wage, however, was paid, less National Health Insurance, and the employee, a railway cement mixer, aged 26, thereby lost, without complaint, a steady income of £2 to £3 per week of overtime money.

The only difficulties which arose were in respect of the somewhat excessive interest of part of the national press, which, incidentally, was not without its amusing repercussions. The first "false alarm" householder was the manager of a national chain store. He and his family readily agreed, at no expense to the council, to abide by all the restrictions. The second instance was a foreman builder, who was equally co-operative, as also was his employer, both financially and otherwise. In both instances the restrictions were removed after 24 hours.

Clearly such a limited experience permits few deductions, but one may be permitted to point out that (1) in most private houses there must be an excellent chance of such a scheme proving practicable, (2) public opinion was surprisingly strong in support, and the wider effects of this were undoubtedly beneficial, and (3) until such time as there are better defences, similar measures will not merely be expected but will be welcomed in this borough.—I am, etc.,

Taunton. L. W. FAY.

Cattle Ringworm

SIR,—Dr. A. J. Rook and Dr. W. Frain-Bell, in their article (*Journal*, November 20, 1954, p. 1198), and Dr. Bethel Solomons, jun., in his letter (*Journal*, December 11, 1954, p. 1420), stress the fact that, although ringworm is so common in cattle, cows rarely suffer from it. There is, I think, no mystery about this, since cows are all adult beasts, whereas beef cattle are usually slaughtered at a relatively early age. As ringworm is, as your correspondents point out, essentially a disease of calfhood and the first two years of life, older beasts rarely contracting more than one or two isolated lesions, the relative immunity of cows is easily explained. There is not, as far as I know, any differential incidence between young heifers destined for the dairy herd and potential beef animals of the same age.

Dr. R. Mason Bolam (*Journal*, December 4, 1954, p. 1359) states that humans rarely contract cattle ringworm a second time. This seems also to be true of cattle once they have had an extensive infection, although if the disease is aborted by treatment when the first lesion appears an extensive infection may follow later.—I am, etc.,

Moreton-in-Marsh. E. H. EASON.

Oestrogen Determinations

SIR,—We shall be grateful if you would inform your readers that the proceedings of this symposium mentioned in your annotation (*Journal*, November 13, p. 1157) will be published in full in the *Memoirs of the Society for Endocrinology*. Copies should be available within the next few weeks, and can be obtained from the publishers, D. Dobson, Ltd., 12, Park Place, St. James's, London, S.W.1.—We are, etc.,

P. ECKSTEIN.
S. ZUCKERMAN.

Birmingham, 15.

Questionary on Human Relationships

SIR,—A survey is being undertaken in order to ascertain women's attitudes to marriage, the home, and the family. It had not been intended to publicize this until such time as the investigation had been fully completed and the findings finalized. The hands of the Research Council into Marriage and Human Relationships have, however, been forced by a recent press reference to the project. We feel, therefore, that in all fairness members of the profession should be made cognizant of the facts.

The survey is being undertaken by the questionary method, and the doctor–patient relationship has been relied on as a means of its distribution, no fewer than 1,500 doctors having taken part. This reflects the interest which doctors—general practitioners in particular—have in the welfare of their patients. Over 6,000 questionaries have already been completed, and these are in the process of being prepared for statistical analysis. On behalf of the council I would like to express thanks and pay tribute to the manner in which the doctors have co-operated.—I am, etc.,

London, W.1. EUSTACE CHESSER.

Blood Groups in Evidence

SIR,—In connexion with a proposed article on this subject I require to gather what information I can regarding the extent to which expert medical evidence on the results of blood grouping tests has in fact been given and accepted in United Kingdom courts of law in paternity and other civil cases. Few cases are reported in medical journals and fewer still in the law reports. One of the obstacles to the wider use of blood group evidence is the ignorance of the scope and value of the tests amongst lawyers. This could be partially dispelled by publication of the full results so far achieved.

Should any of your readers have given evidence of this kind and be inclined to inform me I would be grateful to hear from them the place and date of the hearing, the names of the parties, and the results of the tests.—I am, etc.,

2, Abercromby Place, Edinburgh, 3. ALISTAIR R. BROWNLIE.

Obituary

J. A. C. ROY, M.B., Ch.B.

Dr. J. A. C. Roy, for over 30 years medical superintendent of Cheadle Royal Hospital, died on December 7 at the age of 76.

Born in Scotland on October 23, 1878, the son of the late Dr. William Roy, John Allan Chisholm Roy was educated at Owens College, Manchester, and graduated M.B., Ch.B. from the Victoria University of Manchester in 1903. After graduation he held the post of house-surgeon at the Manchester Royal Infirmary and at the Manchester Royal Eye Hospital. His long association with the Cheadle Royal began in 1907, when he was appointed assistant medical officer at the hospital. His work there was interrupted by the first world war, in which he served as a major in the R.A.M.C. in Mesopotamia and France from 1916 to 1919. Appointed deputy medical superintendent at Cheadle Royal in 1920, he became medical superintendent two years later, and held the position until his retirement in October last year.

We are indebted to Dr. W. V. WADSWORTH for the following appreciation: Dr. J. A. C. Roy remained a bachelor, and dedicated his life to the Cheadle Royal Hospital, which was founded in 1764 by the trustees of the Publick Infirmary of Manchester for the "humane treatment of those suffering from mental and nervous disorders." In their own words the object of the trustees was "to ensure that such patients were carefully attended and tenderly treated," and under Dr. Roy's guidance these aims were completely fulfilled. It was largely owing to his influence that the hospital developed to meet a demand far beyond the expectations of the founders and that it holds its enviable position to-day.

He was a man of strict routine and insisted on starting each day's work by 8 a.m. He had always completed his round of the main block of the hospital long before the assistant medical officers had appeared for duty. He was revered and held in great respect both as a doctor and as a friend by his patients, past and present. He always had the welfare of the staff in mind, and the nurses' home built in the hospital grounds in 1937 can hardly be paralleled in its amenities.

He was a big man in every sense of the word, and until his later years continued to show an active interest in all methods of psychiatric treatment. Cheadle Royal was one of the first hospitals in the country to use "cardiazol" for the treatment of affective disorders. He was a great lover of nature and always maintained a keen interest in the hospital gardens, which, owing to his inspiration, became well known to all northern horticulturists. He had many sporting interests, and was a keen golfer and an ardent supporter of cricket. His strong sense of duty kept him working long after the normal age for retirement, and one can only regret that he had so short a time to enjoy his retirement at St. Annes-on-Sea.

Dr. C. D. LAW died in hospital on November 29 at the age of 82. Charles Donaldson Law was born at Melbourne, Australia, on November 9, 1872, and was educated at Melbourne University and at Edinburgh. After taking the Scottish triple qualification in 1898 he held the appointments of assistant medical officer at Inverness District Asylum, Derby Borough Asylum, and the County Asylum at Hatton, near Warwick, and clinical assistant at Edinburgh Royal Asylum before becoming senior assistant physician at Crichton Royal, Dumfries, in 1904. A few

years later he entered general practice at Warrington, where he became assistant honorary surgeon and, later, senior resident surgeon at Warrington Infirmary. He was also commandant of the West Lancashire (No. 11) Voluntary Aid Detachment, and as medical officer to a battalion of the South Lancashire Regiment served in the R.A.M.C. in France during the first world war, attaining the rank of major. On demobilization he returned to the study of psychiatry, and from the early nineteen twenties until his retirement in 1938 was a member of the staff of the West Riding Asylum at Scalebor Park, Burley-in-Wharfedale. On the outbreak of the second world war he became a member of the medical boards at Leeds and took up locum tenens work in the West Riding. For the past six years he had acted as part-time assistant to Dr. John Prentice at Keighley, where he became well known for his keen interest in his work and for his kindness and old-world courtesy to his patients. Dr. Law throughout his long life took a lively and practical interest in the theatre. He was an actor of considerable ability, and in his early days during vacations played many parts with professional companies in the provinces. At Christmas time he will be much missed, since he used to give a reading of Dickens's *Christmas Carol*, an outstandingly polished performance which earned him a deservedly popular and high reputation among the many charitable organizations which he was only too happy to help. When over 80 he took a principal part in one of the productions by the local theatre group, of which he was an enthusiastic member. He is survived by a married sister in Australia and a niece who is a member of the medical profession, and to them we extend our sympathy.—J. P.

Dr. J. H. ILES died suddenly on December 12 at his home at Starcross, Devon, after a long illness. He was 76 years of age. John Hyde Iles was born at Watford, Hertfordshire, on November 19, 1876, the son of Dr. F. H. W. Iles, and from Pocklington School in East Yorkshire he entered Caius College, Cambridge, where his medical studies were interrupted by service as a private soldier in the Cambridge University contingent which served in South Africa in 1900–01 as part of the volunteer company of the 1st Battalion of the Suffolk Regiment. In this band of brothers he was the acknowledged wit and jester, equally ready to laugh at himself as at others. Invariably cheerful, even in the most depressing circumstances, he was always ready to put his back into whatever task came his way. Returning to Cambridge after the war, he proceeded to the London Hospital for his clinical training, and graduated M.B., B.Chir. in 1907. After graduation he held the appointment of house-surgeon at the Victoria Hospital for Children, Chelsea, before settling at Starcross, where he practised for many years until he retired in 1949. For a very long period he was visiting medical officer to the Royal Western Counties Institution at Starcross.

Dr. J. W. WAYTE died suddenly at his home at Croydon on December 4 at the age of 62. Born on January 1, 1892, the son of the late Dr. J. Wayte, John Wollaston Wayte became a medical student at St. Thomas's Hospital in 1910. On the outbreak of the first world war he volunteered for service as a dresser in a hospital ship, returning to qualify M.R.C.S., L.R.C.P. in 1915. He then held the appointments of casualty officer and house-surgeon at St. Thomas's Hospital before entering the R.A.M.C. to serve in France. He was awarded the M.C. in 1916 for outstanding gallantry in rescuing wounded under heavy fire, and shortly afterwards was seriously wounded himself. After the war he held a resident appointment at the General Lying-in Hospital, London, and took the London degrees of M.B., B.S. in 1919. He then joined his father in partnership at Croydon, and was in due course appointed to the staff of the Croydon General Hospital, being senior surgeon there at the time of his death. For a number of years he was chairman of the hospital staff committee. His other appointments included those of consulting obstetric surgeon to the Godstone and District Rural District Council, and medical officer to the Croydon Post Office, the Croydon Fire Brigade, and the Royal Masonic Benevolent Institute. In 1937–8 he was chairman of the Croydon Division of the B.M.A. A keen Territorial—he was awarded the T.D. in 1938—Dr. Wayte saw active service throughout the second world war in Norway, where he narrowly escaped with his life while in charge of a field ambulance, and in the Middle East, with the rank of lieutenant-colonel. He had charge of a mobile casualty clearing station in the North African campaign. A man of boundless energy and varied interests, he was keenly interested in sport, and in his student days had represented the United Hospitals at Rugby and boxing. He also played tennis, squash, and golf, and in 1945 he was elected president of the Croydon Amateur Boxing Club. During the last two years he had had two serious illnesses. He will long be remembered by his patients, for there can have been few doctors so doggedly determined to put their patients first and foremost and to ensure that everything humanly possible was done for them. The best type of general practitioner, he never failed to give wise and kindly advice to all who sought his help, and his friends will feel his loss deeply. Our sincere sympathy is extended to his widow and four children.—A. R. C.

Dr. WILLIAM SCATTERTY, who was for 36 years medical officer of health of Keighley, Yorkshire, and for 19 years medical officer of health of the Craven combined districts, died at his home at Keighley on December 6. He was 95 years of age. William Scatterty was born at Kennethmont, Aberdeenshire, on January 8, 1859, and was educated at Kennethmont and Huntly schools and at Aberdeen University, where he graduated M.B., C.M. in 1886. He proceeded to the M.D. in 1895, and obtained the Leeds D.P.H. in 1907. After graduation he entered private practice at Keighley in partnership with the late Dr. William Dobie, and so remained until 1892, when he was appointed medical officer of health of Keighley. During this period he was medical superintendent of the Keighley, Bingley, and Shipley Joint Hospital Board, an appointment he relinquished in 1937. He was also honorary consulting physician to the Victoria Hospital, Keighley. On resigning office as medical officer of health of Keighley in 1928 he was appointed medical officer of health for the Craven combined districts, and held this office until 1947. His service as a medical officer of health lasted all told for 55 years. During the first world war Dr. Scatterty equipped a Sunday school and an infectious diseases hospital as military hospitals, and was given the rank of major in the R.A.M.C., subsequently being promoted to lieutenant-colonel. His great interest, however, was in connexion with the St. John Ambulance Association. He founded the first brigade in the Keighley district, and was appointed a Knight of Grace of the Venerable Order of St. John of Jerusalem in 1921. He was president of the Keighley Association, vice-president of the Yorkshire Section, assistant commissioner for No. 5 (Northern) District, and county commissioner for Yorkshire. In recognition of his wide range of public service he was appointed a justice of the peace for the borough of Keighley in 1933. William Scatterty was an honoured and well-beloved figure in the town of his adoption. Up to a fortnight before his death he would be seen daily walking about or chatting with friends. It can be truly said of him that he was of the old tradition, selfless, of high principle, kindly, a loyal friend, and a wise counsellor. The town will not be quite the same without him. He had a long and happy life, a life saddened eight years ago by the death of his wife. He leaves a daughter, to whom we offer our sincere condolences.—H. M. H.

Medical Notes in Parliament

Finance for New Hospitals

Among questions concerning hospital needs of various kinds which regularly confront the Minister of Health, the particular point of hospital construction in the new towns was put to him on December 13.

Mr. K. ROBINSON (St. Pancras, North, Lab.), who asked what special capital provision was to be made for this in the coming year, was told by Mr. IAIN MACLEOD that he hoped it would be possible to make a start on the preliminary stages of a new hospital for Welwyn and Hatfield, which was to be financed from central funds reserved for major projects.

Mr. ROBINSON said that the new towns were providing houses, shops, factories, schools, and even cinemas, but the one thing not being provided was a hospital service. He thought a special allocation would be appropriate where there had to be new provision. Mr. MACLEOD said that in general he was against special allocations. New hospitals were such a vast project that they must be financed centrally, and a special allocation was not appropriate.

Mr. ROBINSON asked Mr. Macleod to consult the Minister of Housing and Local Government with a view to arranging that capital for new hospital construction should be provided by the new town development corporations. Mr. MACLEOD replied that neither he nor Mr. Duncan Sandys considered it appropriate that the development corporations should provide capital for this purpose, any more than for other services that were the responsibility of other statutory authorities. He added that the fair solution was for him to allocate, through the regional boards, what he considered a fair proportion of the money he could obtain from the Chancellor of the Exchequer.

Mr. A. BLENKINSOP (Newcastle-on-Tyne, East, Lab.) asked what were the number and total value of hospital capital projects costing over £100,000 started in the years 1953–4 and 1954–5 and proposed to be started in 1955–6. Mr. MACLEOD informed him that in 1953–4 four such projects were started, with an estimated total value of £1¼m. In the current year 13 had been started so far, with an estimated total value of £2.8m. He so far knew of 12 further projects, estimated to cost £2.2m., which were likely to start between now and the end of 1955–6, but programmes for 1955–6 were not yet available and these might include other projects of this order to be started in that year.

Mr. H. MARQUAND (Middlesbrough, East, Lab.) asked how the capital allocation to hospital authorities in the current financial year compared, allowing for changes in costs in the meantime, with the expenditure on hospital building in the year 1938 or any other convenient year before the war. Mr. MACLEOD said he estimated that the average capital expenditure on hospitals in England and Wales in the three financial years immediately before the war was about three times the allocation for the current year. Mr. MARQUAND said that, in view of the increase in population, heavy war damage, and the creation of new towns, the nation could not be satisfied with this. Mr. MACLEOD replied that he had made great use of these figures over a long period. "What they show—and it is no credit to any of us—is that in the 1930's we were doing three times as much hospital building as either Government has been able to achieve since the Health Service came into operation."

The questions to the Minister of Health on this occasion were so many that they occupied the whole of the question hour. Almost all were about hospital finance, administration, and staffing, and they ranged from national policy to local allocations in many regions. At the end of this prolonged cross-examination Mr. MARQUAND commented that there had not been a single unreasonable question, nor a bad-tempered supplementary. The whole House would be glad that the Minister had stated his intention of seeing the Chancellor of the Exchequer about the capital provision for hospitals, and he asked Mr. Macleod to draw the attention of the Chancellor to the questions and comments of the day. Mr. MACLEOD recalled his statement of a week earlier that no one knew the needs better than the Chancellor of the Exchequer.

Charing Cross Hospital

Mr. G. S. PARGITER (Southall, Lab.) on December 14 asked the Minister of Health whether he was aware of the unsatisfactory buildings of the Charing Cross Hospital and Medical School, and the high capital cost of making temporary provision to meet needs; and when he would authorize the commencement of the new hospital and medical school for which the land had already been acquired and plans approved. Mr. IAIN MACLEOD stated that he was aware of the needs, but he could not forecast when it would be possible to fit the commencement of a new building into the capital programme, having regard to other urgent demands on the available resources.

Guillebaud Committee's Progress

Mr. K. ROBINSON (St. Pancras, North, Lab.) asked the Minister of Health on December 13 whether the Guillebaud Committee had finished taking evidence, and when he expected to receive its report. Mr. IAIN MACLEOD said he understood that the committee had recently completed the hearing of evidence; but that it was still too early to give a precise forecast of the date when they might be ready to report. Mr. ROBINSON asked that the report should be expedited, since possible changes in the structure and financing of the Health Service seemed to be waiting on the report. Mr. MACLEOD said they would get the report as soon as possible. It was such an important report at this stage of the Health Service that he would rather have a completely thorough job done than hurry the committee to get it a month or so earlier.

Cerebral Palsy

The MINISTER OF HEALTH stated in answer to Mr. E. JOHNSON (Manchester, Blackley, Con.) on December 13 that he had no power to make cerebral palsy a notifiable disease, and, in any case, he was not satisfied that notification would achieve any useful result. Mr. JOHNSON said that notification would enable more accurate estimates to be made of the number of spastics, and would also increase the probability of children getting the very early treatment that was of supreme importance. Mr. MACLEOD replied that he had no power in the matter, as this was not an infectious disease. Mr. SOMERVILLE HASTINGS (Barking, Lab.) agreed that the Minister had no powers, but asked him to use his influence with the medical profession to try to get these cases notified to medical officers as soon as possible. Early treatment was important, and in many cases the disease could be recognized in children before they were 6 months old. Mr. MACLEOD said he thought as early notification as possible would be helpful, although there were often considerable difficulties about diagnosis that would complicate the matter.

Mr. E. JOHNSON also asked what action the Minister was taking to provide spastic children with increased facilities for physiotherapy and speech therapy. Mr. MACLEOD said that the physiotherapy and speech therapy services provided under the Health Service were available to spastic children as to others. Local education authorities also provided these services in special schools and as part of the school health service. Mr. JOHNSON said the facilities available were altogether inadequate. Few people could obtain the necessary treatment. If children between the ages of 3 and 5 could be treated they might be able to lead normal lives later on. In any case such treatment would greatly improve the possibility of later treatment being beneficial. Mr. MACLEOD said that he would like to study the matter. They had to make a start in the great cities in view of the small numbers of spastic children and the difficulty of bringing them together in groups. A start was being made in London.

Mr. D. VOSPER, Parliamentary Secretary, Ministry of Education, stated in answer to Mr. D. LLEWELLYN (Cardiff, North, Con.) on December 14 that in 1955 the Glamorgan authority would start building a school for 100 pupils which

should meet the needs of all children in South Wales suffering from cerebral palsy who needed boarding education. A similar school would be built in North Wales if a survey being made showed this to be necessary.

Doctors' National Service

Mr. JOHN RANKIN (Glasgow, Tradeston, Lab.) asked the Minister of Health why the concession granted in 1952, by agreement with the National Medical Manpower Committee, whereby doctors could serve in the Federation of Malaya or West Africa instead of being called up for National Service, had been withdrawn; how many doctors were recruited under this arrangement in each of the territories; and whether the Government would consider restoring the concession. Mr. IAIN MACLEOD stated on December 15 that the concession for West Africa under which 23 doctors were recruited was brought to an end on the recommendation of the Medical Priority Committee, the predecessor of the National Medical Manpower Committee. The arrangement for Malaya related to 12 doctors, who had all been recruited. The Minister of Labour and National Service informed him that there was now no further demand for Malaya from doctors liable to call-up. They were consulting together about West Africa.

Hearing-aids.—Excluding the cost of minor repairs and distribution, which were not separately ascertainable, the cost of electric and non-electric hearing-aids up to March 31 last was about £4m. for the United Kingdom and the Isle of Man, the MINISTER OF HEALTH stated on December 15. At the end of October 401,524 patients had been provided with Medresco aids in England and Wales.

Tuberculosis in the Navy.—The number of cases diagnosed per 1,000 officers and men in the years 1939, 1952, and 1953 were 1.94, 2.71, and 2.38 respectively, the FIRST LORD OF THE ADMIRALTY stated on December 15. The post-war figures, he said, were not directly comparable with those of 1939. Modern techniques brought to light many early and arrested cases which might have escaped notice before the war.

Sanitary Inspectors.—The MINISTER OF HEALTH stated on December 13 that 84 students qualified as sanitary inspectors during 1954, compared with 52 in 1953.

Medico-Legal

IS A.I.D. ADULTERY?

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

On December 13, 1954, Judge Gibson Gorman, of the Superior Court of Chicago, Illinois, made a ruling on an application by Mrs. Mary Doornbos in the course of divorce proceedings that she should have sole custody and that her husband should have no access to a child born to her as a result of A.I.D. The petition also asked for a declaration that A.I.D. should be declared moral and not adulterous.[1]

Judge Gorman ruled that A.I.D. with or without the husband's consent was "contrary to public policy and good morals," illegal, and constituted adultery on the part of the wife; and that accordingly the child was illegitimate and the mother's husband had "no right or interest" in him so as to entitle him to custody or access. Judge Gorman's decision did not follow the ruling of another Illinois judge, Judge Holmgren, given recently, in which he held that when a child is born within a marriage there is a legal presumption that the husband is the father.

A.I.D. is one of the problems with which those whose function it is to expound the common law are apt to be faced by the advance of medical science. Its solution is not facilitated by the legal theory that the law has existed complete since Angevin times, is expounded not altered or developed by the judges, and is changed only by Parliament. Before A.I.D. it was easy for a lawyer to conclude that, if a child was born during a marriage as a result of something other than sexual intercourse between husband and wife, adultery had taken place. So easy was the conclusion that the English courts have scrupulously avoided any definition of adultery, and have gone so far as to hold that sexual intimacies not amounting to full sexual connexion do not constitute adultery. The birth of a child as a result of A.I.D. poses the problem whether any "matrimonial offence" known to English law has been committed.

It is very doubtful whether in English law A.I.D. amounts to adultery. Even if it were held to do so, if done with the husband's consent the husband would be precluded from relying upon it as a ground of divorce by reason of what the law would call his connivance and conduct conducing to the adultery. Moreover, there is a presumption in English law that children born during marriage are legitimate. This presumption does not determine the question if it can be affirmatively proved that the husband was absent at the appropriate period, or impotent, or otherwise conclusively not the father, but the presumption in favour of legitimacy obtains even though it is proved that others besides the husband have had intercourse with the mother during the critical period. However, the English courts would certainly agree with Judge Gorman in holding that if the child was illegitimate the husband had no legal right to custody or access once the marriage has broken up.

[1] *Daily Telegraph*, December 14, 1954.

BROKEN HYPODERMIC NEEDLE

On September 6, 1951, Mr. Arthur Corner, then aged 69 years, sustained an injury to his back while working at the Royal Ordnance Depot, Greenford. He visited his general practitioner, Dr. Maurice Murray, who injected a local anaesthetic into the site of the injury. At the conclusion of the injection Dr. Murray was about to withdraw the hypodermic needle from the patient's body, when it broke off close to the mount. He was unable to extract the broken piece of needle and accordingly sent the patient to the Central Middlesex Hospital. On the following day an operation was performed there, and the piece of needle removed, the patient being discharged from hospital on September 15, 1951.

In April, 1953, Mr. Corner, having obtained a civil aid certificate, brought proceedings in the High Court against Dr. Murray alleging that he had been negligent in the administration of the injection and claiming general damages and special damages as follows:

Expenses to and from hospital	£1 1s. 0d.
Pyjamas	£1 10s. 0d.
Dressing-gown	£1 10s. 0d.
Slippers	5s. 0d.
Loss of wages as from December 10, 1951, to April 20, 1953, and continuing	£432 0s. 0d.
	£436 6s. 0d.

Before trial the plaintiff abandoned his claim for pyjamas, dressing-gown, and slippers.

The action was remitted for trial to the County Court and was heard by Judge Tudor Rees at Brentford County Court on November 26, 1954.

In his evidence the plaintiff said that he had been unemployed since the injury to his back, but that this was on account of the original injury and had not resulted from anything which Dr. Murray had done. He admitted that in December, 1951, he had refused an offer of re-employment at the Royal Ordnance Depot, and also that his expenses to and from hospital had not amounted to one guinea but to 3s. 8d.

Evidence was given for the plaintiff by Mr. J. Acloque, a metallurgist, who said that his examination of the part of the needle extracted from the patient's body led him to think that its breaking had been caused by encountering a hard object. In cross-examination Mr. Acloque agreed that the problem in the case was not a metallurgical one. Giving evidence for the defendant, Mr. J. G. Bonnin, consultant surgeon, said that the breaking of hypodermic

needles was a not uncommon occurrence, the risk of which doctors had to accept. In his opinion this could occur without any negligence on the part of the doctor.

In his judgment Judge Tudor Rees said that he found that there had been no negligence or any semblance of negligence on the part of Dr. Murray. On the question of damages he found that the plaintiff, by his own evidence and by the statements of his counsel, had abandoned all his claim to special damages save for 3s. 8d. for omnibus fares. He found, again on the plaintiff's own evidence, that he had no claim for general damages at all and expressed the view that this claim had been made to give "a show of respectability to the action." His Honour accordingly gave judgment for Dr. Murray, but having regard to the plaintiff's means, which consisted solely of his old-age pension, he made no order for costs.

The Medical Defence Union instructed Messrs. Hempsons, solicitors, to act for Dr. Murray.

HEART PIERCED BY ASPIRATION NEEDLE

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

At an inquest held on November 26 at Wakefield by the West Riding coroner on Wendy Patricia Warke, aged 11, evidence was given that death was due to puncture of the pericardium by a chest aspiration needle. On November 17 the child, who had been in perfect health, came home early from school feeling ill with pain in the back. She went to bed, and two days later was admitted to the County General Hospital, where the diagnosis, confirmed by radiography, was a pneumothorax. Next morning the usual treatment of underwater drainage of air from the chest by a chest aspiration needle was carried out under local analgesia, and she showed no distress.

Next morning she collapsed. *X*-ray examination disclosed fluid in the chest cavity. An injection of nikethamide had little effect, and she was put in an oxygen tent and given blood transfusions. The draining-needle was removed, and the fluid was found to be rather watery blood. Her condition seemed to improve, and next day she was transferred to the thoracic unit at Pinderfields, where she died following a convulsion and collapse early the next morning.

Dr. Adler, pathologist, of Pindersfield Hospital, who made the post-mortem examination, concluded that the needle had penetrated the heart. He said it was unfortunate that a sharp needle was used and that it was left in for so long. He was sure that it was after the needle had been properly inserted that the heart was punctured. He thought that as the lung expanded the heart tended to move across to the other side and might have impinged upon the needle.

A verdict of misadventure was recorded.

PNEUMONIA CAUSED BY WORKING CONDITIONS

The Court of Appeal on December 16 dismissed the appeal of Walnut Cabinet Works Ltd. from a decision awarding an employee £401 18s. 6d. damages because he contracted pneumonia in their employment.[1] The employee, Mr. J. A. Murray, had had to work in an artificial draught created to remove poisonous fumes. Owing to the expansion of their business the employers had not got any heating in the room where the plaintiff had to work from September to November, 1952. On November 7, 1952, he was taken ill with pneumonia.

In his judgment[2] Lord Justice Denning said that in most cases an illness such as pneumonia could not be traced down to its cause, but on the evidence of doctors on each side in this case the judge (Mr. Justice Cassels) had concluded that the pneumonia was due to the cold, continuous draught in which the plaintiff had worked. The Court of Appeal could not interfere with the judge's finding on that point. It must be very rare, he said, that an illness such as pneumonia, which was not an occupational disease like dermatitis and which might befall anyone in the course of life, could be attributed to the fault of employers.

Lords Justices Morris and Parker concurred. Leave to appeal to the House of Lords was refused.

[1] *British Medical Journal*, October 30, 1954, p. 1054.
[2] *The Times*, December 17, 1954.

Universities and Colleges

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a meeting of the Council of the College held on December 9, with Sir Harry Platt, President, in the chair, Mr. Bryan McFarland (Liverpool) was appointed as the Robert Jones Lecturer for 1955.

The Begley Prize was presented to G. S. Rawson (Guy's), and the Hallett Prize to Rasamay Ganguly (Calcutta) on the result of the recent Primary examination for the Fellowship held in Ceylon.

The appointment of Dr. N. M. Cass as Lecturer in Physiology was confirmed.

Diplomas of Fellowship were granted as follows: R. Kelvin, R. W. L. Calderwood, J. W. T. Dixon, B. H. Brock, I. S. M. Jones, P. Timmis, K. Ll. Williams, H. B. Juby, C. W. Smith, R. H. P. Oliver, J. D. Griffiths, N. A. Green, N. A. J. Niles, D. N. Walder, J. McK. Duncan, H. Segal, I. McN. Smith, M. Abdel-Razek, A. C. Akehurst, A. M. Beech, D. T. Beetham, S. T. Leong, W. R. Probert, E. L. Ryan, B. N. Baijal, R. Habib, W. J. Morris, P. R. Reddy, J. F. Shaw, J. Candy, P. Chandra, P. Gibson, I. J. Gordon, A. J. Ogg, A. G. Pollen, D. I. Roberts, J. Whitwell, W. A. Anderson, K. Arumugam, G. T. F. Braddock, A. K. Ghosh, J. Kyle, J. P. O'B. McMullin, B. G. Peet, D. E. H. Phillips, J. A. Turner, O. N. Vyas, J. H. B. Yule, N. D. Bhiwapurkar, I. W. Broomhead, J. E. F. Coolican, H. R. England, J. M. Foreman, D. W. Low, P. J. Ryan, G. Sinh, A. B. Alder, D. S. Bamji, A. A. Belton, F. G. O. Burrows, B. N. Colabawalla, F. T. Crossling, E. Dayan, I. L. Evans, M. C. Gilbert, J. C. Gillman, G. E. Heard, L. L. Hoare, J. L. C. Lahz, Lena E. McEwan, A. T. Matheson, D. de G. Villet, J. L. Williams, A. Gabriel, D. A. A. Lane, D. J. Ll. Murphy, A. J. Seeley, G. C. Staniland, N. Thompson, J. P. Tonkin, R. I. H. Welsh, E. J. C. Wynne, M. V. Braimbridge, P. C. Dubey, J. E. Gasson, R. I. Mitchell, A. K. Mitra, E. G. Perry.

Diplomas of Membership were granted to R. C. Giles and D. M. Mahabir.

Diplomas of Fellowship of the Faculty of Anaesthetists were granted as follows: E. T. Thomas, E. T. Mathews, P. J. Nobes, S. A. Rahaman, R. S. Gillinson, D. D. Hamlyn, N. M. Cass, D. D. B. Morris, F. W. Oliver, Rosemary A. Faull, Margaret N. Barr.

The following diplomas were granted, jointly with the Royal College of Physicians of London:

DIPLOMA IN TROPICAL MEDICINE AND HYGIENE.—A. M. M. Huq, G. L. Ritchie.

DIPLOMA IN MEDICAL RADIO-DIAGNOSIS.—H. Abdalla, J. M. Allcock, J. S. Boyd-Wilson, P. S. Brahma, R. Branster, I. McC. Carmichael, P. H. Coldwell, R. V. Dan, M. G. Desai, P. D. De Villiers, W. W. Frank, I. Friedman, F. S. Grebbel, Isabella Grey-Thomas, K. H. Harper, N. Kaplan, C. Krishna Rao, E. W. Moore, Mary G. Murphy, M. N. Phillips, S. K. B. Ray, B. Rosenberg, B. B. Roy, Helen Sender, J. G. Sowerbutts, J. H. Stewart, J. V. Todes.

DIPLOMA IN MEDICAL RADIOTHERAPY.—C. F. Baxter, S. Bissyllas, K. N. H. Low, Helen M. Mellor.

DIPLOMA IN PATHOLOGY.—S. S. Epstein, M. Roy, A. Swan, J. W. Weston.

DIPLOMA IN CHILD HEALTH.—R. S. Bull.

The Services

Brigadier W. A. D. Drummond, C.B., C.B.E., late R.A.M.C., has been appointed Deputy Director-General, Army Medical Services, War Office, and has been regranted the temporary rank of Major-General.

Colonel (Temporary Major-General) E. H. Hall, O.B.E., late R.A.M.C., has relinquished his appointment as Deputy Director-General, Army Medical Services, War Office, retaining the temporary rank of Major-General.

Surgeon Lieutenant J. P. Masterton, R.N.V.R., has been awarded the Polar Medal for good services as medical officer with the British North Greenland Expedition from July, 1952, to August, 1954.

Colonel D. J. Muil, O.B.E., late R.A.D.C., has been appointed Director, Army Dental Services, in succession to Major-General J. Wren, C.B.E., Q.H.D.S., late R.A.D.C.

Brigadier F. J. O'Meara, late R.A.M.C., has been appointed Director Medical Services to the Army and has been granted the temporary rank of Major-General.

Surgeon Captain A. H. Harkins, R.N., has been appointed an Honorary Physician to the Queen in succession to Surgeon Rear-Admiral T. N. D'Arcy, C.B., C.B.E., R.N.

Surgeon Captain D. H. Kernohan, R.N., has been appointed an Honorary Surgeon to the Queen in succession to Surgeon Captain J. H. B. Crosbie, R.N.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **December 4** (No. 48) and corresponding week 1953.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1954					1953				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	13	0	9	0	5	26	1	5	1	1
Dysentery	463	37	188	25		370	47	243	1	2
Encephalitis, acute	0	0		0		0	0	0	0	
Enteric fever:										
Typhoid	0	0	0	0	1	1	0	0	1	
Paratyphoid	2	0	5(A)	0		1	0	1	0	
Food-poisoning	183	24		0		164	18		0	
Infective enteritis or diarrhoea under 2 years				15	26				21	31
Measles*	6,017	390	548	318	73	816	24	37	14	80
Meningococcal infection	35	0	9	3	1	30	5	14	1	1
Ophthalmia neonatorum	33	1	3	0		32	2	5	1	1
Pneumonia†	728	37	207	7	2	534	41	171	5	
Poliomyelitis, acute:										
Paralytic	29	6	11	1	2	66	1	27	4	7
Non-paralytic	13	2				29	4			
Puerperal fever§	233	43	9	5		246	27	12	1	1
Scarlet fever	893	69	186	51	41	1,400	96	217	37	51
Tuberculosis:										
Respiratory	677	75	128	27				146	20	
Non-respiratory	98	10	32	6				19	6	
Whooping-cough	2,156	127	180	37	51	2,410	126	285	53	60

DEATHS in Great Towns	1954					1953				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	0	0	0	0	0	0	0	0	0	0
Dysentery	0	0		1		0	0	1	0	
Encephalitis, acute		0			0		0			0
Enteric fever	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years	5	0	1	2	1	10	0	1	1	2
Influenza	47	4	2	1	1	10	0	2	1	1
Measles		0	0	0	0		0	0	0	0
Meningococcal infection		1	0				0	1		
Pneumonia	262	35	22	9	9	209	27	20	6	4
Poliomyelitis, acute	1	0			0	6	0			0
Scarlet fever		0	0	0	0		0	0	0	0
Tuberculosis:										
Respiratory	90	12	14	3	8	96	10	8	3	1
Non-respiratory		0	15	1	0		2	1	2	2
Whooping-cough	2	0	0	0	0	4	0	0	0	0
Deaths 0–1 year	223	24	24	11	23	191	26	30	11	19
Deaths (excluding stillbirths)	5,918	834	606	144	200	5,269	695	575	133	169
LIVE BIRTHS	6,933	1055	821	201	330	6,752	982	853	205	361
STILLBIRTHS	207	26	29			205	18	25		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Vital Statistics

Scotland in 1953

The birth rate during 1953 was 17.76 per 1,000 population, being 0.08 above the rate for 1952, but 0.61 below the average rate for 1948–52. The infant mortality rate was 30.8 per 1,000 live births, and was the lowest rate ever recorded in Scotland. The rate was 4.4 below the rate for 1952 and less than half the rate of ten years earlier. The neonatal mortality rate was 19.3 per 1,000 live births, and the death rate between one month and one year was 11.5; these rates were 2.4 and 2.0 respectively below the rates for 1952.

The death rate for 1953 was 11.50 per 1,000 population and was 0.53 below the value for 1952; it was the lowest rate ever recorded there. The standardized death rate has declined more rapidly than the crude rate, owing to the ageing population. The crude death rate fell from 13.26 in 1931 to 11.50 in 1953, while the standardized death rate fell from 12.45 to 7.76. On the basis of the mortality experience of 1953 the expectation of life at birth was 65.68 for males and 70.68 for females. These are the highest values ever recorded. The corresponding values in 1930–2 were 56.0 and 59.5, and in 1861–70 they were 40.3 and 43.9.

The deaths from respiratory tuberculosis numbered 1,159, being 250 fewer than in 1952, and 1,288 less than the average for 1948–52. Non-respiratory tuberculosis resulted in 182 deaths compared with 203 in 1952 and an average of 344 for the five preceding years. The deaths from cancer, 10,125, were equivalent to a death rate of 198 per 100,000 population; the rate was the same as in 1952, but 5 above the average of 1948–52. Deaths of males numbered 5,310, and of females 4,815. The number of deaths from diseases of the coronary arteries was 7,568 (4,842 for males and 2,726 for females) and was 170 below the total for 1952, but 4,765 above the value for 1941, when mortality from this cause started to rise. Of the 387 deaths from the principal epidemic diseases 115 were attributed to influenza, 41 to whooping-cough, and 39 to measles. Only 2 deaths occurred from diphtheria, 6 fewer than in the preceding year; it was the lowest total ever recorded. Compared with 1952, deaths from violence rose by 231 to 2,766; of the total, 752 were transport accidents—177 more than in 1952.

The population changes recorded for the period 1861–1951 show that the net loss by migration for the whole country was 1.5m. Thirty counties showed a loss by migration over this period which ranged from 23 to 117% of the 1861 population, while three counties showed gains of 0.4, 6.9, and 17.8%. For the 40 years for which data are available it is estimated that two-thirds of the migrants went overseas and one-third went to England.

Third Quarter, 1954.—The infant mortality rate was 24 per 1,000 live births, according to the *Quarterly Return.* This rate was 4 below that for the corresponding quarter of 1953, and 8 below the five-years average; it was the lowest quarterly rate ever recorded in Scotland. The general death rate rose slightly. At 10.3 per 1,000 population it was 0.4 higher than the rate for last year's third quarter, and 0.2 above the five-years average.

Infectious Diseases

In England and Wales during the week ending December 4 the largest rises in the number of notifications were 745 for measles, from 5,272 to 6,017, 114 for acute pneumonia, from 614 to 728, and 44 for scarlet fever, from 849 to 893, and the only large fall was 205 for whooping-cough, from 2,361 to 2,156.

The largest increases in the incidence of measles were 374 in Lancashire, from 2,181 to 2,555, 136 in Durham, from 281 to 417, 119 in Gloucestershire, from 91 to 210, and 117 in London, from 273 to 390, and the only large decrease was 59 in Cheshire, from 363 to 304. Only small variations occurred in the trends of scarlet fever; the largest

was a rise of 21 in Middlesex, from 31 to 52. The largest decreases in the local returns of whooping-cough were 75 in Warwickshire, from 159 to 84, and 43 in Durham, from 168 to 125, and the largest increase was 47 in Lancashire, from 224 to 271. 13 cases of diphtheria were notified, being 6 fewer than in the preceding week. The chief feature of the returns of diphtheria was a fall from 8 to 4 in Lancashire. The 2 cases of paratyphoid fever were notified in Southampton, Basingstoke M.B.

42 cases of acute poliomyelitis were notified during the week. These were 5 fewer for paralytic and 3 fewer for non-paralytic cases than in the preceding week. The largest returns were London 8 (Camberwell 2, Hackney 2), Yorkshire West Riding 5 (Leeds C.B. 2), Lancashire 4, and Isle of Wight R.D. 3.

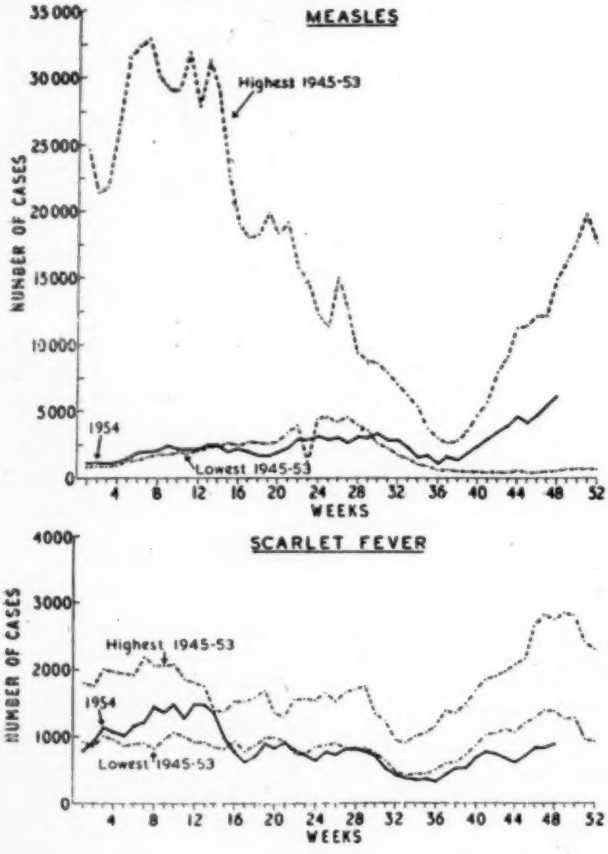
463 cases of dysentery were notified, being an increase of 16 on the preceding week. The chief centres of infection were Lancashire 113 (Morecambe and Heysham M.B. 20, Liverpool C.B. 17, Oldham C.B. 15), Yorkshire West Riding 65 (Sheffield C.B. 31), London 37 (scattered through 11 boroughs), Warwickshire 33 (Coventry C.B. 20), Norfolk 29 (Norwich C.B. 23), and Staffordshire 27 (Stoke-on-Trent C.B. 18).

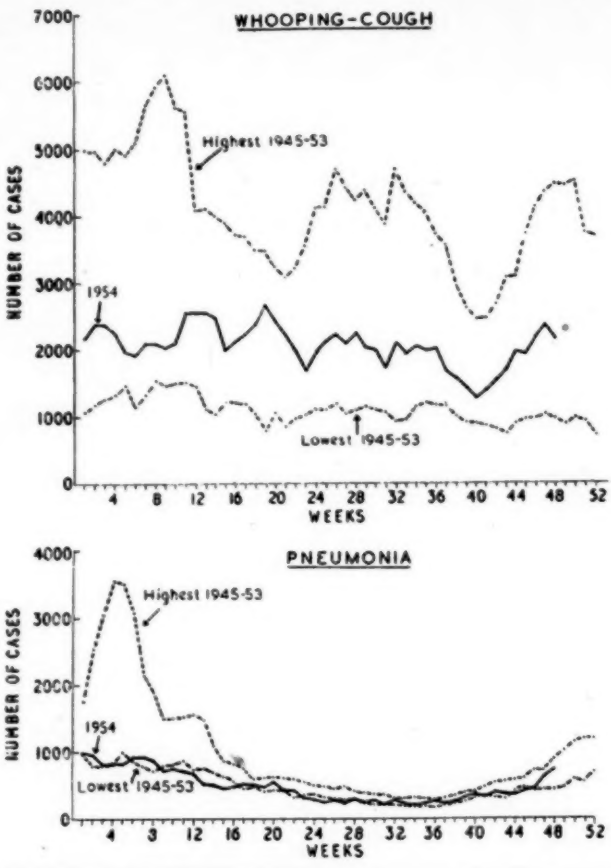
Week Ending December 11

The notifications of infectious diseases in England and Wales during the week included : scarlet fever 709, whooping-cough 2,047, diphtheria 15, measles 6,298, acute pneumonia 768, meningococcal infection 21, acute poliomyelitis 43, dysentery 357, paratyphoid fever 7, and typhoid fever 2.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1945–53 are shown thus - - - - - -, the figures for 1954 thus ————. Except for the curves showing notifications in 1954, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.





Medical News

Human Problems of Industrial Communities.—On December 16 the DUKE OF EDINBURGH presided at a meeting at Buckingham Palace, which discussed plans for what is to be called "The Duke of Edinburgh's Study Conference on the Human Problems of Industrial Communities within the Commonwealth and Empire." This conference will be held in Oxford in July, 1956. The meeting, which constituted itself a council with Sir HAROLD HARTLEY as chairman, consisted of nearly 40 leading industrialists, nine trade union officials, and one or two others. The Duke of Edinburgh will be president of the Oxford conference, which will be concerned with both personal factors in industry, such as work satisfaction and health and welfare schemes, and the social problems that industrialization creates for the individual, his family, and the community. One unusual feature of the conference is that the members will be young —"between the broad age limits of 25 and 45." Some 280 will be invited, of whom about two-thirds will come from overseas.

Research on Toxaemia of Pregnancy.—Last month Oxford University accepted a grant of £24,500 from the Nuffield Foundation to support work at the Nuffield Institute for Medical Research on pregnancy toxaemia of sheep for a four-year period. The work is being carried out by a veterinary worker, Mr. H. B. PARRY, under the direction of Dr. G. S. DAWES. This large grant follows one of £3,700 to support an earlier pilot investigation. It was found in this that by over-feeding pregnant ewes so that they made large weight gains, and then suddenly and severely restricting their diet, toxaemic symptoms, indistinguishable from naturally occurring toxaemia of pregnancy, were induced in 17 of 20 ewes, whereas none in a control group subjected only

to overfeeding were affected. In the toxaemic ewes, according to a preliminary paper read before the Physiological Society in September (*J. Physiol.*, 1954, **126**, 40P) there was some evidence of an abnormal renal circulation, and at necropsy the normal ratio of the adrenal weight : thyroid weight was doubled. The experimental findings have already been tested in practical husbandry. By limiting weight gain during early pregnancy in two flocks the ewe mortality was reduced from 15–20% to less than 1%. In the view of the Nuffield Foundation, there are so many points of similarity between toxaemia of pregnancy in women and the condition found in ewes that "the prime cause may well be the same."

Polar Medals.—On the return of the two-year British North Greenland Expedition last August, the members were awarded the Polar Medal by the Queen. Among them were the two doctors, Dr. H. ELLIS LEWIS and Dr. J. MASTERTON. The expedition was primarily to carry out a geological survey of the arctic ice cap, including measurements of its thickness, but in addition physiological, meteorological, and other studies were made. Dr. Lewis and Dr. Masterton acted as medical officers to the expedition as well as carrying out research on the effects of the arctic climate on their companions. They investigated its effects on metabolism, nutrition, and the blood; looked for possible physiological adaptations to the cold; and studied the effect of the polar night on the body's customary diurnal rhythms.

Eradication of Malaria in America.—The Pan-American Sanitary Bureau is sponsoring an attempt to rid the American continent of malaria within a period of five years. The malarial zones of America support a population of about 135 million, of whom 60 million live in zones where malaria is now suppressed. However, there remains the constant danger that malaria may be reintroduced into these zones unless the disease is stamped out entirely. The standard required before a country can claim freedom from malaria is three consecutive years without the report of a single case. By this standard malaria has been eradicated from five provinces of the Argentine republic, from three in Ecuador, and from the whole of the United States with the possible exception of a few counties in Texas, according to a World Health Organization statement.

Medical Equipment of Fishing Boats.—Revised scales for the medical stores and equipment to be carried on all classes of sea-going British fishing boats have been issued by the Ministry of Transport and Civil Aviation (Notice No. M.387). Scales I and II, applying to boats of 25 tons or over with the exception of those engaged solely in fishing off the coast of Britain, are compulsory and their infringement makes the owner liable to a fine not exceeding £20. Scale III is a recommended scale and is applicable to boats that habitually return to port at night. Failure to observe this scale carries no penalty.

Royal Commission on Mental Laws.—The Royal Commission on the Law Relating to Mental Illness and Mental Deficiency have named March 1, 1955, as the final date for the submission of memoranda of evidence for their consideration. Any persons wishing to submit evidence should send a memorandum of evidence in writing by that date to the Secretary of the Royal Commission, whose present address is Ministry of Health Building, Savile Row, London, W.1. As from January 24 the address will be 30, Chester Terrace, Regent's Park, London, N.W.1.

Colombo Plan Visit.—Under the Colombo Plan Technical Co-operation Scheme, Professor MAX ROSENHEIM, Professor ROBERT KELLAR, Mr. HAROLD EDWARDS, and Dr. STANLEY MASON are to visit India on a lecture tour. Their object is to demonstrate new techniques in diagnosis and treatment, and to suggest new methods of teaching and stimulating research. The visit has been arranged by the Government following a request from RAJKUMARI AMRIT KAUR, India's Minister of Health. The party are expected to leave London on December 27.

Poliomyelitis Research Fellowship at Manchester.—At the annual meeting of the National Fund for Poliomyelitis Research, held in London on December 15, the establishment of a research fellowship in the department of bacteriology at Manchester University was announced. The first holder will be Dr. P. B. STONES, lecturer in bacteriology, who is working on poliomyelitis virus.

Sphygmomanometer Standards.—The British Standards Institution has circulated draft British standards for mercury and aneroid sphygmomanometers to both manufacturers and others interested. Comments must be received before January 26. The drafts have been prepared by one of the Institution's technical committees under the chairmanship of Dr. GEOFFREY BOURNE.

Professor Dorothy S. Russell, director of the Bernhard Baron Institute of Pathology at the London Hospital, has been elected into a supernumerary fellowship of Girton College, Cambridge.

Oliver Memorial Fund for Blood Transfusions.—This year's award of £50 has been made to a Mr. A. F. LESLIE, of London, who has made 126 donations of blood. This is believed by the Memorial Fund's committee to be a record for this country.

COMING EVENTS

Watson Smith Lecture.—Dr. G. B. DOWLING will lecture at the Royal College of Physicians, Pall Mall East, on January 11 at 5 p.m. on "Scleroderma and Dermatomyositis."

Society for the Study of Fertility.—Annual conference at Birmingham Medical School, June 23–24. Details later from the hon. secretary, Mr. H. H. FOURACRE BARNS, F.R.C.S., 31, Weymouth Street, London, W.1.

NEW ISSUES

Thorax.—The next issue (Vol. 9, No. 4) will be available in a week's time. The contents include:

TRUDEAU SANATORIUM.

CHANGES IN ISONIAZID RESISTANCE OF TUBERCLE BACILLI AFTER CESSATION OF TREATMENT. M.R.C. Isoniazid Trial: Report No. 6.

CAVITATION IN THE MASSIVE FIBROSIS OF COALWORKERS' PNEUMOCONIOSIS. G. S. Kilpatrick, A. G. Heppleston, and C. M. Fletcher.

AN APPRECIATION OF BRONCHOSPIROMETRY AS A METHOD OF INVESTIGATION BASED ON 125 CASES. H. A. Fleming and L. R. West.

SPIROMETRIC AND BRONCHOSPIROMETRIC STUDIES IN FIVE-RIB THORACOPLASTIES. Torsten Lindahl.

A REPORT OF TWO CASES OF SARCOIDOSIS WITH BRONCHIAL CARCINOMA. Michael Jefferson, W. T. Smith, A. Brian Taylor, and K. Valteris.

HEMIDIAPHRAGMATIC PARALYSIS AND PARESIS OF UNKNOWN AETIOLOGY WITHOUT ANY MARKED RISE IN LEVEL. N. Wynn-Williams.

PULMONARY INFARCTS ASSOCIATED WITH BRONCHOGENIC CARCINOMA. W. J. Hanbury, R. J. R. Cureton, and G. Simon.

NORMAL STANDARDS FOR LUNG VOLUMES, INTRA-PULMONARY GAS-MIXING, AND MAXIMUM BREATHING CAPACITY. C. D. Needham, Mary C. Rogan, and I. McDonald.

THE RELATION BETWEEN THE FAST VITAL CAPACITY CURVES AND THE MAXIMUM BREATHING CAPACITY. L. Bernstein and G. Kazantzis.

EXTRA-AURICULAR MITRAL VALVOTOMY. Helge Baden and Frederik Therkelsen.

TUBERCULOUS CAVITATION OF THE APICAL SEGMENT OF THE LOWER LOBE. H. J. H. Hiddlestone and A. J. Taylor.

Published quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Thursday, December 30

LONDON JEWISH HOSPITAL MEDICAL SOCIETY.—8.30 p.m., colour and sound film by Professor Ian Aird: Boko Twins; Dr. M. Kopp: Modern Views on Anterior Poliomyelitis.

APPOINTMENTS

ATKINSON, P. B., M.R.C.S., L.R.C.P., D.Obst.R.C.O.G., Regional Medical Officer, Ministry of Pensions and National Insurance.

BAINBRIDGE, CYRIL, O.B.E., M.B., B.S., B.Hy., D.P.H., Senior Administrative Medical Officer, Eastern Regional Hospital Board (Scotland).

CRAMOND, WILLIAM A., M.D., D.P.M., Assistant Psychiatrist (Consultant), at Kingseat Mental Hospital, Newmachar, on the staff of the Aberdeen Mental Hospital Board.

HARRISON, AGNES T., M.B., B.Ch., D.P.H., Assistant County Medical Officer of Health, West Cumberland.

HOSPITAL FOR SICK CHILDREN, Great Ormond Street, London, W.C.—W. K. M. Muir, L.R.C.P.&S.Ed., L.D.S. R.C.S., Dental House-surgeon; Yvette A. P. Franklin, M.B., B.S., M.R.C.P., D.C.H., House-physician; E. P. G. Michell, M.B., B.Ch., M.R.C.P., D.C.H., Assistant Medical Registrar; June Stephenson, M.B., Ch.B., D.C.H., Resident Medical Officer, Tadworth Court; C. H. MacD. Walker, M.D., M.R.C.P.Ed., D.C.H., and B. W. Webb, M.D., M.R.C.P., D.C.H., Assistant Medical Registrars; Althea G. Matthews, M.B., B.S., M.R.C.P., D.C.H., and Elizabeth M. Johnson, M.B., Ch.B., D.Obst.R.C.O.G., D.C.H., House-physicians; S. J. Cohen, M.B., B.Ch., M.R.C.P.Ed., and A. R. Bearn, M.B., B.S., House-surgeons.

MANCHESTER REGIONAL HOSPITAL BOARD.—Kathleen V. Lodge, M.D., Consultant Pathologist, Wythenshawe, Baguley, and the Duchess of York Hospitals; J. F. Doherty, M.B., Ch.B., M.Rad., Consultant Radiologist, Wythenshawe and Baguley Hospitals; L. Doyle, M.B., B.Ch., M.R.C.P.I., D.C.H., Tuberculosis Physician and Deputy Physician Superintendent, Baguley Hospital; S. Szutowicz, M.B., Ch.B., Assistant Pathologist, Rochdale and District Hospitals; L. Phillips, L.R.C.P.&S.Ed., Assistant Pathologist, Macclesfield and District Hospitals and Parkside Hospital, Macclesfield; G. J. M. Teunon, M.B., Ch.B., M.Rad., D.M.R.D., Consultant Radiologist in charge of the Diagnostic Radiology Service to the Blackburn and District Hospitals; T. M. Haughie, M.B., Ch.B., D.P.M., D.P.H., Consultant Psychiatrist and Deputy Medical Superintendent, Whittingham Hospital; P. H. Mitchell, M.D., D.P.M., Consultant Psychiatrist and Deputy Medical Superintendent, Lancaster Moor Hospital; H. A. Rowley, M.B., B.S., M.R.C.O.G., Part-time (eight half days) Consultant Obstetrician/Gynaecologist, North Manchester Hospitals; Z. S. Lech-Lachowicz, M.B., D.M.R.D., Assistant Radiologist (S.H.M.O.), North Manchester and Booth Hall Hospitals.

MONRO, I. C., M.D., D.P.H., Medical Officer of Health, Lanarkshire.

PRITCHARD, P. V., M.D., F.R.C.P.Ed., D.P.H., F.R.F.P.S.(Glas.), Medical Officer of Health and Divisional School Medical Officer, Gosport Municipal Borough and Assistant County Medical Officer, Hampshire.

ROSS, R. M., M.B., Ch.B., D.P.H., Medical Officer of Health, Dudley County Borough.

STEWART, G. G., M.R.C.S., L.R.C.P., D.P.H., County Medical Officer of Health, Essex.

WHITTLES, JAMES HILL, M.D., D.P.H., Deputy County Medical Officer of Health and Deputy Principal School Medical Officer, County of Wiltshire.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Shinton.—On November 23, 1954, at the Maternity Hospital, Birmingham, to Margaret (formerly Hyde), M.B., Ch.B., wife of Keith Shinton, M.B., M.R.C.P., a son.

MARRIAGES

Bearblock—Higgins.—On December 11, 1954, at Wandsworth, London, S.W., Dr. Charles Henry Bearblock, D.Obst.R.C.O.G., of Saltash, Cornwall, to Dr. Pamela Elizabeth Higgins, of East Hill, Wandsworth.

DEATHS

Boyd.—On December 11, 1954, at a private nursing-home, Belfast, Joseph Douglas Boyd, M.B., B.Ch., late of Oxford Road, Manchester.

Edmond.—On December 12, 1954, at his home, Nairn, The Chase, Kingswood, Surrey, Robert Edmond, L.R.C.P.&S.Ed., L.R.F.P.S., D.D.S., of 9, Cavendish Square, London, W.

Heard.—On December 2, 1954, at West Coker House, Yeovil, Somerset, Jane Murray Sophia Heard, M.B., Ch.B., aged 81.

Howlett.—On December 6, 1954, in a nursing-home, Parkstone, Dorset, Arthur Waltham Howlett, M.B., Ch.B., Major, R.A.M.C., retired, aged 74.

Hughes.—On December 1, 1954, the result of an accident, Geoffrey Roland Hughes, M.R.C.S., L.R.C.P., of Bridge Cottage, Pangbourne, Berks, formerly of Tudor House, Barnet, Herts, aged 72.

Humphrys.—On December 2, 1954, at Tunbridge Wells, Kent, Herbert Edward Humphrys, M.B., B.Ch., aged 71.

Law.—On November 29, 1954, in hospital, Charles Donaldson Law, L.R.C.P.&S.Ed., L.R.F.P.S., of Grafton House, Keighley, Yorks, aged 82.

Ritchings.—On December 9, 1954, at her home, Swansea, Mary Ann Thompson Ritchings, M.B.E., M.B., Ch.B., aged 77.

Robinson.—On November 30, 1954, at the Hospital of St. John and St. Elizabeth, London, N.W., Ralph Leslie Robinson, M.R.C.S., L.R.C.P., of 8, Bronwen Court, St. John's Wood, London, N.W., aged 73.

Roy.—On December 7, 1954, John Allan Chisholm Roy, M.B., Ch.B., of Cheadle, Cheshire, aged 76.

Scatterty.—On December 6, 1954, at Highfield House, Keighley, Yorks, William Scatterty, M.D., D.P.H., aged 95.

Swanson.—On December 10, 1954, at a nursing-home, Glasgow, Agnes Maud Swanson, M.B., of 708, Finchley Road, Golders Green, London, N.W.

Tinsley.—On December 3, 1954, Sidney Verling Tinsley, M.B., Ch.B., J.P., of 4a, North Road, Spennymoor, Co. Durham, aged 70.

Tivy.—On December 10, 1954, at his home, Coolavin, South Woodham, Essex, Eric Reginald Tivy, M.B., B.Ch.

Wayte.—On December 4, 1954, at 57, Park Hill Road, Croydon, Surrey, John Woollaston Wayte, *M.C.*, T.D., M.B., B.S.

White.—On December 5, 1954, at Cloister House, Rochester, Kent, Clement White, M.D., aged 81.

Wornum.—On November 30, 1954, Eric Wornum, M.B., B.S., of 8, Fitzhardinge Street, London, W., aged 61.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Santa Claus

Q.—*Do you think that any psychological harm is caused by telling children that Santa Claus is a real person? What is the best advice to parents?*

A.—It is impossible to give direct answers without knowing the circumstances of the case. Has the questioner in mind, for example, an isolated family or one in which the children mix freely with other children who may or may not have beliefs in this matter? Are they Christian, European, or perhaps Christian but living in a non-Christian community? And so on.

If parents do not commit themselves, English Christian children up to the age of 6 or 7 will be more likely to believe than to disbelieve the reality of Santa Claus. But, in any case, children up to this age tend not to differentiate between reality and make-believe and will be content to live with heroes who are partly fact and partly fiction. Need parents attempt to be explicit? It would appear that more harm, and certainly more confusion, can be caused by parents going against the prevailing conventions, in the interests of a truth which their children are not sufficiently developed to appreciate. The best advice to parents may well be: follow your own feelings, but think twice before you come out against children's popular opinion on the subject. Do not attempt the thankless task of distinguishing sharply between fact and fancy; do not get yourselves involved in a conflict of belief in your child's mind. If enquiring young cynics corner you, explain gently that Santa Claus is truly make-believe, but a jolly idea, for all that. Even hard-boiled youngsters may be alive to some of the advantages of the convention, and nearly all children enjoy make-believe.

Treatment of "Chronic Mastitis"

Q.—*Could you kindly advise treatment for breast pain from chronic mastitis in a woman of about 40? On surgical advice I tried testosterone. Lately I was told that this might cause cancerous change.*

A.—"Chronic mastitis" is an unsatisfactory diagnosis and is usually a label applied to cases in which painfulness of the breasts is often mainly a manifestation of over-anxiety, frustration, and the like. Fear of cancer is also an important factor. The value of verbal reassurance tends to be lost if at the same time some special treatment is prescribed; so it may be better merely to advise the patient to wear a well-fitting brassière and to neglect any minor discomfort she may experience. She should, however, be examined periodically to exclude tumour formation.

Hormone therapy is often advised, but results are not very satisfactory, and it has the disadvantage of concentrating the woman's attention on her complaint. Testosterone may give some relief by depressing breast activity; it does not induce cancer, but can have virilizing effects if it is given for too long or in too high doses. Oestrogens do not help much, and it is just possible that they favour the development of carcinoma of the breast or genital tract in women who happen to be disposed to such conditions; their chief disadvantage, however, is that they disturb the menstrual rhythm and may cause excessive and prolonged bleeding. Some put faith in ethisterone in the treatment of painful breasts, and this at least can do no harm. If the mastalgia

is mainly premenstrual in time rigid reduction of the intake of fluid and salt often helps. Firm reassurance and correction of the psychological or environmental background, however, are the essential features of successful treatment.

Infectiousness of Scales in Scarlet Fever

Q.—*Are the desquamated scales of scarlet fever infectious, and, if so, for how long?*

A.—The intact skin, and therefore the desquamating scales, of the scarlet-fever patient can be infected only through the implantation on them of the causative streptococcus, generally from the upper respiratory tract or from a septic discharging focus, such as the middle ear. If, therefore, there is no reason to suspect that the patient is harbouring the organisms in such areas, the inference should be that the intact skin epithelium is not contaminated. Terminal disinfection —for example, bathing—followed by clean clothing, should ensure that any accidental skin contamination has been removed before discharge from hospital, always assuming of course that all foci of infection have been cleared up.

A Motorist: Alcohol or Hypertensive Encephalopathy

Q.—*A motorist of 54, charged with being under the influence of alcohol, was found at the time of his examination at the police station to have a blood pressure of 180/120. (He had been resting for at least half an hour before the reading was taken.) Counsel for the defence suggested that the accused's behaviour could be explained on the basis of an attack of hypertensive encephalopathy, the alcohol admitted to have been consumed being incidental. (a) What clinical signs would be helpful in either establishing or refuting this suggestion? (b) Does alcohol precipitate attacks of encephalopathy in hypertensive patients?*

A.—The symptoms of hypertensive encephalopathy usually come on gradually over hours or days and are essentially those of increased intracranial pressure such as severe headache and vomiting. Focal symptoms and signs are not uncommon—e.g., paraesthesiae and transient pareses. In its severest form fits and loss of consciousness occur. Examination may reveal some abnormal physical sign in the nervous system—e.g., an extensor plantar response on one side. Since the attacks tend to occur in the severer forms of hypertension the diastolic blood pressure is usually very high and the fundus oculi shows narrowed arteries and haemorrhages and exudate. Papilloedema may be present. The urine usually but not invariably contains albumin and may show other abnormalities such as the presence of red cells and casts.

Attacks of encephalopathy must be very rare indeed in essential hypertension of the degree mentioned, if they occur at all. To make such a hypothesis acceptable it would be necessary to produce evidence of a previous attack, or at least some evidence of previous angiospasm. There is no good reason why the consumption of alcohol should be apt to precipitate an attack of hypertensive encephalopathy and I am aware of no evidence that it does so.

Contraception after the Menopause

Q.—*How long should a previously fertile woman continue to use a birth control appliance after menstruation has ceased?*

A.—Some considerable time must elapse after the last period before it is reasonably certain that the menopause is established. Even then, postmenopausal ovulation is a possible, if rare, occurrence. With these points in mind it is generally advised that contraception should be practised for two years after the last period.

Nursery Decoration

Q.—*What are the best colours for the walls and ceiling and the furniture of a residential nursery for young babies? Is it true that certain colours have an adverse and others a beneficial psychological effect?*

A.—There is no definite evidence that certain colours have an adverse and others a psychologically beneficial effect especially on young babies. It is, however, usually assumed that light colours and pastel shades are more cheerful and give a warmer and more pleasing effect. Nurseries in private houses are usually decorated in shades of soft primrose, pale pink, pale green, or pale blue, but this probably is rather to please the eye of the adults than because it has any known effect on the babies and young children. From the age of about 3½ to 4 years children do usually show a definite preference for one or more colours, and in my experience the commonest colours for them to like are pink (it is noteworthy that a child will nearly always choose a cake with pink icing on it), mauve, yellow, and occasionally bright red. It is improbable, however, that they would like to be in a room where the walls were too vivid or where there was too much of a pattern. Sensitive, imaginative children, especially when ill, are very apt to see sinister shapes and faces in wallpaper patterns and flowers or to find stripes and other patterns irritating. Adults are often similarly affected. Scenes from nursery rhymes in soft colours if attached to the wall are often appreciated by small children, provided they are at eye level; otherwise, of course, they do not see them. It would certainly seem advisable to avoid dark colours such as browns, heavy greens, startling reds, or dark blues, as these would certainly have a depressing effect on the adults even if not on the children.

Psychogenic Perspiration

Q.—*Could you tell me what treatment is effective in reducing excessive perspiration? I have in mind a healthy girl of 24 who suffers from excessive perspiration of the hands, feet, axillae, and face when excited at the prospect, for example, of going to a dance, or apprehensive, for example, at the prospect of an interview. This is proving a social embarrassment. She is in a good state of health apart from dysmenorrhoea and a nervous disposition, and has had no serious illness.*

A.—The reduction of excessive psychogenic perspiration is as difficult as the relief of undue blushing, and the two problems are very similar. Both are emotional responses related to personality, and are exaggerations of normal (physiological) reactions. It is probable that, if the patient can gain self-confidence and become better adapted to human relationships, she will lose this distressing symptom.

Drug treatment is not altogether satisfactory. The new synthetic anti-cholinergic drugs reduce sweating, but most patients find the accompanying dryness of the mouth and the mydriasis intolerable. Atropine has similar disadvantages, though belladonna given with phenobarbitone and ergotamine (as in "bellergal") may reduce psychogenic sweating, and phenobarbitone in a dose of gr. ¼ (16 mg.) twice daily may, by reducing excitement, have the same effect. Amylobarbitone sodium in doses of 1 gr. (65 mg.) is said to have some ganglion-blocking effect.

Radiotherapy of the hyperidrotic areas is unwise except in fractional doses such as 120 r at two or three weekly intervals for three or four doses. This only temporarily reduces the activity of the sweat glands, and the risk of causing atrophy of the skin and other serious changes should never be taken.

A daily bath in a 10% solution of sodium hexametaphosphate and the application of the following dusting powder are useful measures: sodium hexametaphosphate 5; salicylic acid 2, and zinc oxide, talc, and boric acid in equal parts to 100.

Sugar and Toothache

Q.—*Why does sugar make teeth ache?*

A.—Sugar is apt to make teeth ache when there is some loss of the protecting covering of enamel and dentine so that the dental pulp is more readily stimulated. This may occur in conditions such as attrition, abrasion, erosion, and particularly dental caries. It is not clear whether sugar acts as a chemical stimulus on the exposed dentine or whether the action is entirely physical in nature. The effect of sugar is often most marked at the neck of a tooth. Here the enamel may sometimes fail to meet the cementum during the development of a tooth so that a small portion of dentine remains exposed. More often, however, exposure is due to recession of the gum, which leaves an area of cementum uncovered. This, being much softer than the enamel, is soon worn away so that the dentine is exposed in a region which is near the pulp and therefore particularly responsive to stimuli.

Anti-growth Factor

Q.—*Is there such a thing as an anti-growth factor? Does the vitamin B complex in some way hold the growth-promoting factor of the pituitary in check?*

A.—Obviously there are potent mechanisms in the body for limiting growth, but as yet no substance has been recognized as a general and specific anti-growth factor. Possibly cortisone comes near to answering this description. There is no well-established evidence that any member of the vitamin B complex opposes the pituitary growth factor.

NOTES AND COMMENTS

Castration of a Male Homosexual.—Dr. S. LASK (London, W.13) writes: Why does your expert state that "castration other than for therapeutic purposes is an illegal operation" ("Any Questions?" October 23, p. 1001)? Is there a law forbidding this operation? A chapter by two barristers (one of whom is now a judge) in *Modern Trends in Obstetrics and Gynaecology* (Butterworth, 1950) states that the authors know of no authority to support the proposition that it is illegal to sterilize a man or woman by any form of operation solely because the patient wishes to avoid having children. If a patient may be castrated for such a reason, why not for other reasons such as to avoid imprisonment?

OUR EXPERT writes: Your correspondent is correct in saying that Mr. S. E. Karminski, Q.C. (as he then was), and Mr. C. Trevor Reeve in their chapter in *Modern Trends in Obstetrics and Gynaecology* express the view that a surgeon may legally sterilize a man or woman because the patient wishes to avoid having children. They do not, however, specify whether the parents wish to avoid having children because of possible danger to the wife's health, to prevent the transmission of disease, for economic reasons, on religious or philosophic grounds, or merely because they do not like children. I do not think they ought to be taken to be suggesting that castration is a legal operation in every circumstance.

There is no direct authority on this point, and it is therefore difficult to predict with certainty the way in which the court would decide such a case. The principle of law involved is dealt with in two passages in *Russell on Crime* (tenth edition), the first at page 760, which reads, "As a general rule, if consent is freely given by a rational and sober person knowing the nature of the act, it is an answer to an indictment for assault, unless the consent is to do bodily harm amounting to mayhem (maim) or to acts likely or intended to do bodily harm or to an injury constituting a breach of the public peace." The second passage at page 763 reads, "Consent to a surgical operation frees the operator from criminal responsibility for assault when freely given when knowledge of the purpose of the operation and when the purpose is lawful and the operation is performed with professional skill." A similar passage in Kenny's *Outlines of Criminal Law* (sixteenth edition) at page 159 reads, "Consent is no defence criminally for an assault that involves some extreme and causeless injury to life, limb, or health; or even one that constitutes a breach of the peace; nor for an assault likely to cause bodily harm (whether extreme or not) and not justified by any good reason." Mayhem, or maim, is defined by Mr. Justice Stephen in *Stephen's Digest of Criminal Law* at page 129 as "bodily harm whereby a man is deprived of the use of any member of his body or of any sense which he could use for fighting, or by the loss of which he is generally and permanently weakened, but a bodily injury is not a maim merely because it is a disfigurement." The learned judge expressed the view that castration is a maim.

The point was considered by Lord Justice Denning in a recent case (*Bravery* v. *Bravery*, 1954, see *British Medical Journal*, 1954, **2**, 366). In this case the Court of Appeal considered whether a man who had himself sterilized without his wife's consent was guilty of cruelty entitling his wife to a decree of divorce. Lord Justice Denning expressed the view that "an ordinary surgical operation, which is done for the sake of a man's health, with his consent, is, of course, perfectly lawful because there is just cause for it. If, however, there is no just cause or excuse for an operation, it is unlawful even though the man consents to it." The learned Lord Justice then referred to two old cases. The first concerned a man in 1604 who got his companion to cut off his left hand so that he might avoid work, the better to beg. Both were found guilty on indictment of a criminal offence. The second case was heard in early Victorian days, when soldiers as a part of their drill had to bite cartridges. One soldier got a dentist to pull out his front teeth so as to avoid the drill. Again both soldier and dentist were guilty of a criminal offence. Lord Justice Denning expressed the view that the same principle applied to a sterilization operation, and said, "When it is done with the man's consent for a just cause it is quite lawful, as, for instance, when it is done to prevent a transmission of a hereditary disease; but when it is done without cause or excuse, it is unlawful, even though the man consents to it." The learned Lord Justice goes on to deal with exactly the point raised by your correspondent when he refers to "a sterilization operation to enable a man to have the pleasure of sexual intercourse without shouldering the responsibilities attached to it." "The operation," he says, "is plainly injurious to the public interest. It is degrading to the man himself. It is injurious to his wife and to any woman he may marry, to say nothing of the way it opens to licentiousness; and, unlike contraceptives, it leaves no room for a change of mind on either side. It is illegal even though the man consents to it."

The remainder of the Court in this case, Sir Raymond Evershed, Master of the Rolls, and Lord Justice Hodson, dissociated themselves with these general observations of Lord Justice Denning. They said that the legality or otherwise of sterilization operations was irrelevant to the particular case, and they were not prepared to hold in that case that such operations must be regarded as injurious to the public interest.

Therapeutic reasons can no doubt cover a wide field, but I find it difficult to believe that the Court would countenance sterilization done because a married couple wish to avoid having children for economic reasons, still less to enable a bachelor to have sexual intercourse without risking possible paternity. Nor, in my view, would the Court accept the right of a surgeon either to castrate a male homosexual merely to prevent the possible commission of criminal offences, or to satisfy the desire of a male transvestite for castration, unless in each case the Court was satisfied that the operation was genuinely for the benefit of the man's health.

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